

Dental Digest

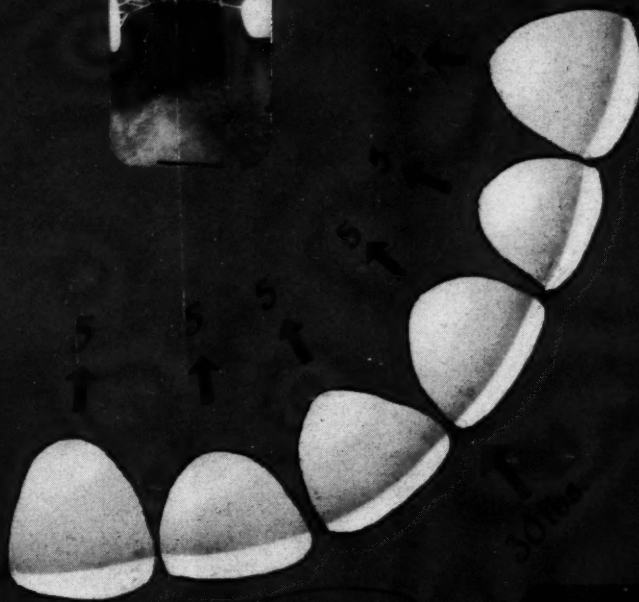
August 1954

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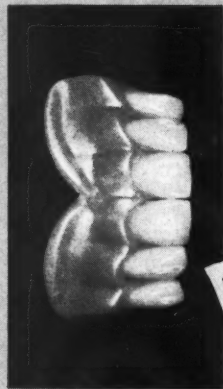
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IN YOUR CHOICE OF **VERI-CHROME** PORCELAIN OR **VERIDENT** PLASTIC...

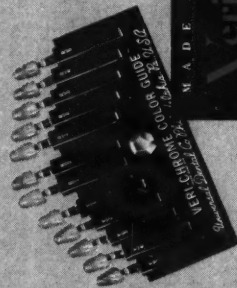


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AUGUST 1954**About Our****CONTRIBUTORS**

MURRAY N. RUBINSTEIN, D.D.S. (New York University, College of Dentistry, 1924) has published many articles in which he described step-by-step restorative procedures which he has found useful. His current presentation is **SPLINTING: PERIODONTAL AND PROSTHETIC SUPPORT**.

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708 Church Street, Evanston, Illinois

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SPLINTING:

Periodontal and Prosthetic Support

MURRAY N. RUBINSTEIN, D.D.S., New York

DIGEST

A splint is an appliance designed to mitigate the disrupting lateral stresses of mastication on individual teeth by affording them mutual reciprocal support.¹ Splinting is an invaluable adjunct in dental treatment. The stabilizing effect of splinting facilitates periodontal care particularly in mobile teeth. In prosthetic procedure the utility of abutment teeth is increased and their retention prolonged.

Results from Splinting

Clinical experience has conclusively demonstrated that splinting will accomplish the following purposes:

- (1) Stabilize teeth
- (2) Provide the means for equitable division of the masticatory load throughout its components so that the pressure on each tooth may be brought within its physiologic tolerance. The diagram (Figs. 1A and 1B) by Moses² illustrates the statement graphically.
- (3) Support derived from splinting will often succeed in helping the bone and periodontal membrane reorganize into favorable patterns, resulting in firmer teeth. This conclu-

sion has been sufficiently supported in dental literature.^{1, 2, 3, 4, 5, 6, 7, 8}

Indication for Temporary Splints

Splints may be of temporary or permanent construction. The operator should decide whether a temporary or permanent splint is required. Temporary splints are indicated in the following situations:

- (a) For teeth loosened by accident
- (b) To secure a tooth affected with periodontitis during treatment
- (c) To stabilize teeth until more

permanent treatment may be undertaken

- (d) To act as support for mobile teeth during periodontal treatment

Types of Splints

Among a variety of splints that may be constructed are the following:

1. Grassline ligature
2. Wire ligature
3. Acrylic
4. Combination of wire and acrylic
5. Removable types of acrylic and/or cast metal cusps
6. Temporary onlay splints
7. Permanent cast splints of
 - (a) Inlays
 - (b) Cast Crowns

Silk Ligatures—Aid in stabilizing teeth and securing moderate tooth movement may be obtained by the use of wire and/or silk ligatures.⁷ Because floss or silk tends to become loose and contaminated, its use is limited to cases where stabilization is required for only a few days. This would apply especially in cases of periodontitis where immobilization of the affected tooth is indicated and also for limited use in periodontal treatment.

Wire Ligatures — On the other hand, wire ligatures may be employed for an extended period of time. The technique for the application of wire ligatures is relatively simple and will render a surprising

¹Fish, Wilfred F.: Parodontal Disease, London, Eyre & Spottiswood, 1952, p. 173.

²Moses, Charles H.: Natural Laws in Dentistry, J. Prosthetic Dent. 3:307 (May) 1953.

³Sorin, S.: Fixed and Removable Splints, Am. J. Orthodont. and Surg. 31:6 (June) 1945.

⁴Miller, S. C.: Textbook of Periodontia, Philadelphia, The Blakiston Company, 1947.

⁵Simring, M.: Splinting, JADA 45:402 (Oct.) 1952.

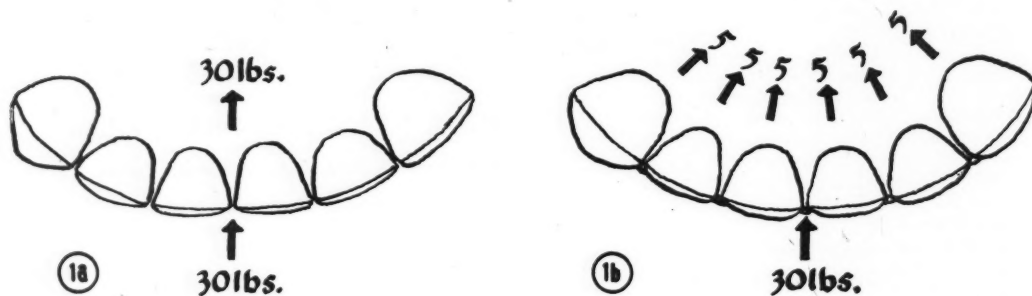
⁶Chaiken, B. S.: Temporary Splinting in Periodontal Therapy, Alpha Omegan 47:2-97 (Sept.) 1953.

⁷Hirshfeld, L.: Use of Wire and Silk Ligatures, JADA 41:647 (December) 1950.

⁸Orthopedic Research Group: Splints in Dental Practice, J. Prosthetic Dent. 3:325 (July) 1953.

1A. Teeth unsplinted. Force is transmitted directly to the teeth.

1B. Splinted teeth tend to divide the applied force. (Figs. 1A and 1B courtesy of Charles H. Moses, D.D.S., "Natural Laws in Dentistry" Journal Prosthetic Dentistry, May, 1953.)



degree of support to loose teeth. In many such cases, teeth under periodontal treatment will respond more favorably if splinted (Fig. 2).

Arch Wire and Interproximal Loops

—A continuous labial and lingual arch wire and short single interproximal loops will accomplish a most satisfactory splint:

1. Using .010 stainless steel wire, the labial loop is formed by passing it through the space distal to the cuspid from the labial (Fig. 3).

2. The loop is placed loosely against the lingual surfaces of the anteriors and drawn through the space distal to the opposite cuspid, to the buccal. Here it is tied to the opposite buccal arm by twisting the two ends together loosely in clockwise movement.

3. Short individual pieces of .008 wire are used to tie the lingual arm to the buccal at each interproximal space.

4. The individual piece of wire is passed under the loop from the buccal then passed back over the loop through to the labial.

5. The ends are twisted with the aid of a hemostat in clockwise motion and pulled labially until tightened; thus causing the loop to adjust about the teeth tightly above the gingulum and under the contact point (Fig. 4).

- 6: The ends are cut and tucked into the interproximal space out of the way.

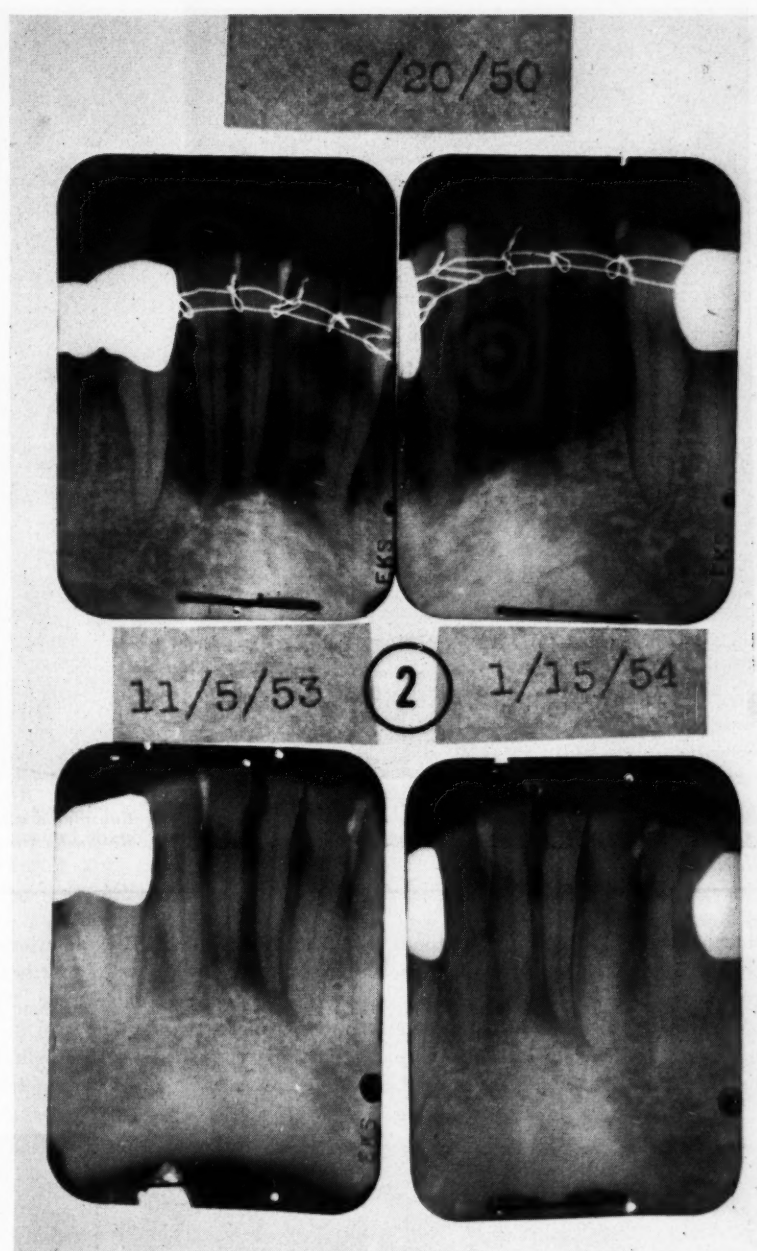
7. Should the splint subsequently become loosened it is simple to tighten by further adjustment of the interproximal loops.

8. The ends of the large buccolingual loop are tightened, cut short and also tucked out of the way into the interproximal embrasure (Fig. 5).

Cervical Retaining Wire—Should the labial lingual loop tend to slip incisally because of a conical shaped tooth, it is helpful to use a cervical retaining wire loop.

1. Using the .008-gauge wire, a loop is made at the cervical of the cuspid or adjacent bicuspid and made tight by twisting a few times.

2. The labiolingual wire is placed



2. Improvement resulting from wire splint control.

in between the strands of this cervical twist and the retaining wire is twisted tight to secure the large loop (Fig. 6).

3. The ends of the cervical loop are cut short and tucked into the interproximal space.

4. If it is desired to maintain a space existing between the teeth the interdental space may be maintained

by twisting the larger loop to take up the space.

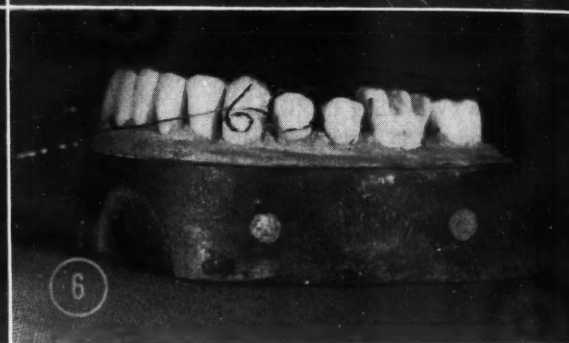
Wire and Silk Ligature Combination—Teeth that have drifted from normal positions may be repositioned simply with the use of a wire and silk ligature combination:

1. Using a wire splint tied about a few normally positioned teeth as anchorage, a loop of silk from this



3. Labial wire .010.

4. Individual interproximal loops .008.



5. Completed wire splint.

6. Retaining wire to hold labiolingual in position.

anchorage tied to the drifted tooth will gradually bring back the displaced tooth (Fig. 7).

2. When returned to position these teeth may be included in the wire ligature splint for as long as required.

3. A simple method of retaining these teeth in the desired position is the use of a cast continuous clasp (Figs. 8A and 8B). The continuous cast clasp is of great use in immobilizing teeth for periods as long as required.

4. Ease of handling permits the patient to continue thorough oral hygiene as the clasp can be removed and replaced at will.

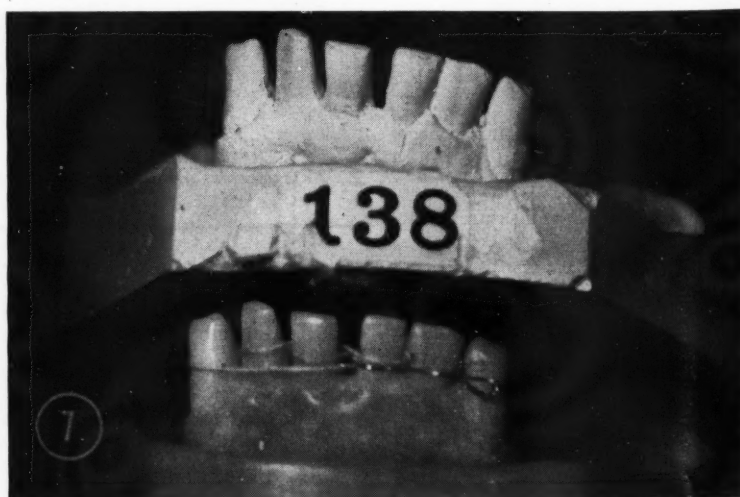
5. Care should be taken to provide occlusal rests to prevent settling of the clasp which would cause the appliance to act as a wedge. This applies particularly where the clasp crosses the cuspid-bicuspid space, and for posterior teeth.

Durable Temporary Splint—When it is planned to fabricate a fixed mul-

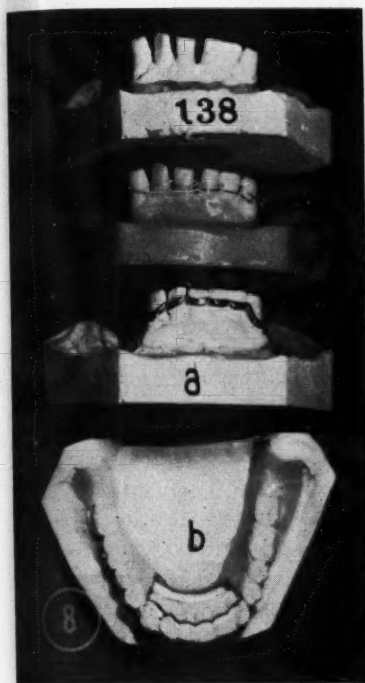
tiple crown splint for the anteriors after moving these teeth together properly, a more durable type of temporary splint is one that is of internal type construction. This splint will permit keeping the teeth in the

desired position for a period of time to aid in securing regeneration of bone about the repositioned teeth after which veneers may be prepared.

Internal Splint—The internal type of splint is obtained in the follow-



7. Combination wire and grassline ligature to reposition drifted teeth.



8A. Continuous clasp to retain repositioned teeth.

8B. Partial lower retained by continuous clasp above.

ing technical manner (Fig. 9):⁹

1. With a small diamond wheel cut a channel across the palatal or lingual surfaces of the anteriors at the level of the contact points and if desired include the occlusal of the first bicuspid up to the distomarginal

ridge. This channel should be 1 to 1½ millimeters deep.

2. Using a 35 inverted cone bur undercut the channel.

3. Form a double twisted strand of .010 wire and adapt this so that it will rest within the channel inertly.

4. Remove the wire.

5. Place quick curing acrylic in the channel, using the brush technique. Replace the previously fashioned wire in position and fill the channel slightly overfull.

6. After permitting a thorough set of at least 20 minutes the bite may be adjusted and the acrylic polished.

Removable Splint—Another removable type of splint may be obtained by use of acrylic reinforced with 21-gauge stainless steel wire.³ This splint is especially useful for small segments and is completed in the following way:

1. Secure an accurate stone model.

2. Tin-foil the teeth.

3. As an example in construction use the anterior teeth. Starting at the cuspid buccal, contour the wire across the cingulum, bring the wire around the opposite cuspid, contour across the labial surfaces at the same level, and bring to the starting point.

4. A mix of quick curing acrylic of color to match the patient's teeth is placed over the wire across the lingual and labial surfaces.

5. The wire at the distal of the cuspids is not covered.

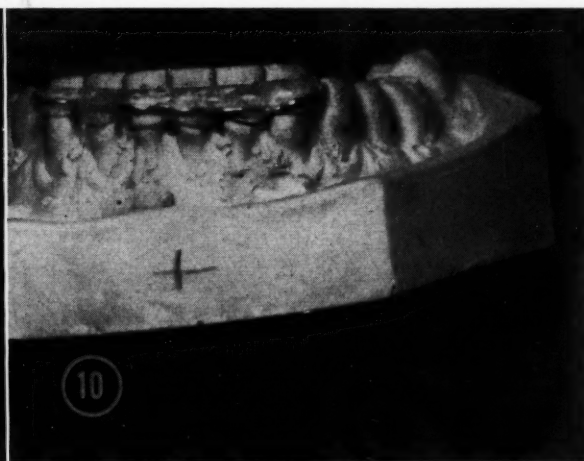
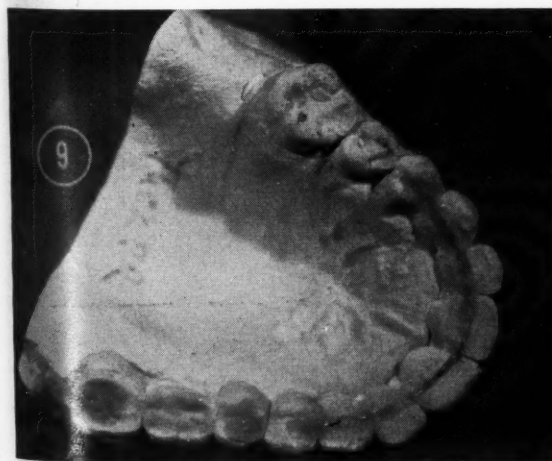
6. After permitting the acrylic to set thoroughly it may be finished off and polished (Fig. 10).

7. This type of splint has the advantage of immobilizing the teeth and may maintain teeth that have been moved into position. It is not irritating to lips and tongue and is acceptable esthetically.

Aid in Repositioning the Mandible

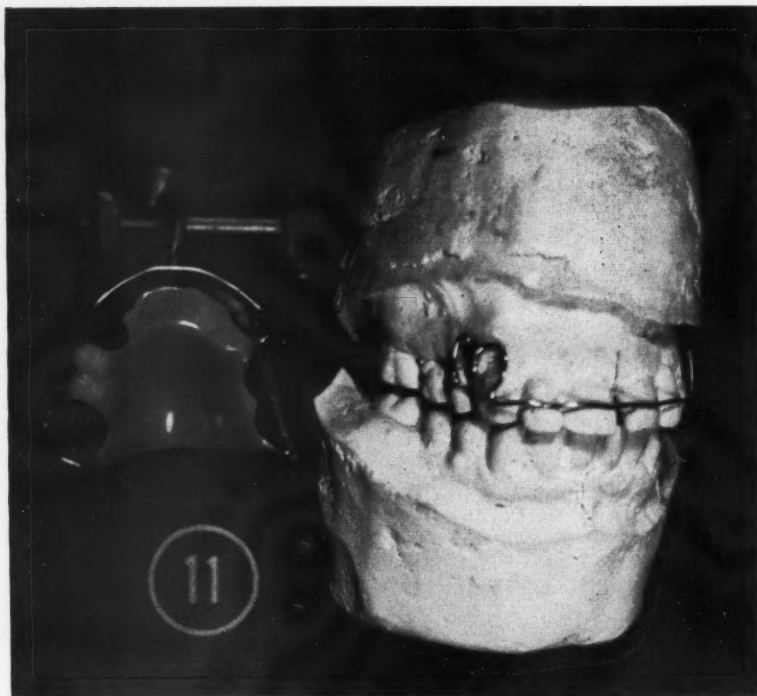
—The Hawley acrylic splint is of useful and varied application in dental treatment. Of primary interest is its aid in repositioning the mandible. In this type of case due to a malocclusal factor, an abnormal neuromuscular habit results from the patient trying to avoid a premature occlusal contact. This causes a strain which invariably displaces the condyles in the fossae. Employment of a flat shelf behind the anterior teeth disoccludes the posteriors and thereby permits free movement of the mandible. It is worn twenty-four hours a day except for cleaning purposes. After a week or so the patient will usually be able to register true centric without difficulty. This results because once freed from false guidances caused by premature contacts, the musculature may now return to normal and bring the mandible to its true position (Fig. 11).

Tooth Movement Secured — The labial wire can also be employed to move teeth that have moved labially or when diastemas between teeth have been created due to a faulty



9. Internal splint of acrylic and wire.

10. Wire and acrylic removable splint.



11. Hawley splint with flat shelf.

occlusion. At this point manipulation of the labial wire will secure a variety of tooth movement.

Position of the Wire—Closing the loop will generally retrude the incisors and so tend to close the diastemas. If the labial wire is made near the incisal closing, the loop will

affect rotation and simple tipping. With the labial wire near the gingival, closing the loop will secure bodily movement of the teeth.¹⁰

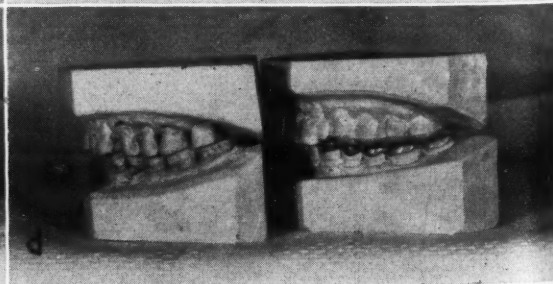
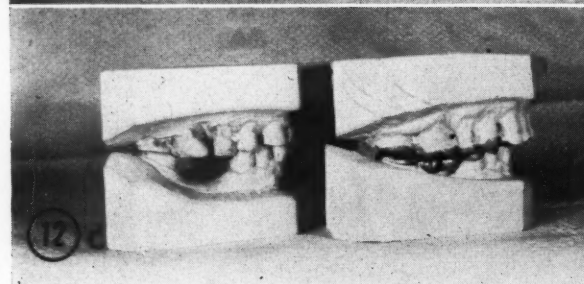
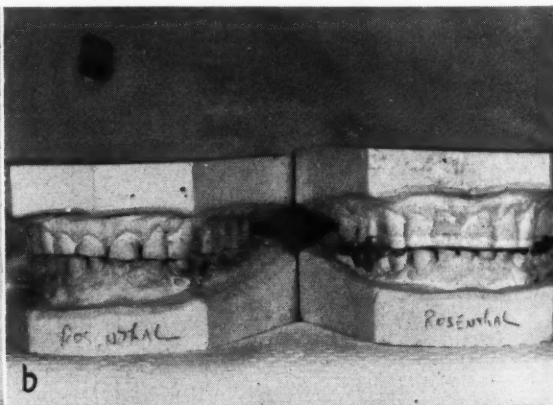
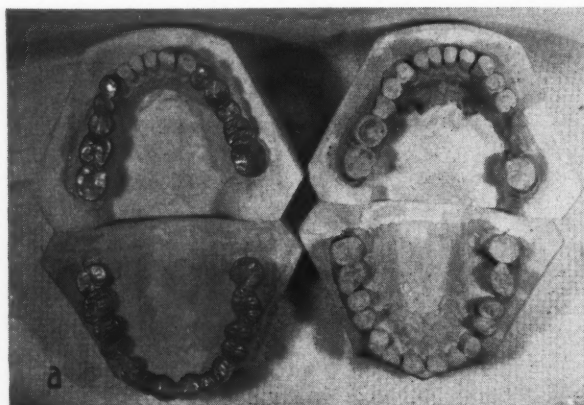
When the teeth have been repositioned the retainer will maintain the new position as long as necessary until a permanent plan of treatment can be undertaken.

The Onlay Splint—Another form of temporary splint which is very useful in diagnostic value in cases of worn mutilated dentitions is the onlay splint. The height to be restored and the position of the desired occlusal plane is determined. Wax patterns are fashioned and cast restoring the lost tooth structure. These may be cemented to the teeth for a period of four to six weeks to demonstrate their acceptance by the patient. After this period, reconstruction of a permanent nature may be undertaken to this established pattern (Figs. 12, A, B, C, and D).

Fixed Splinting

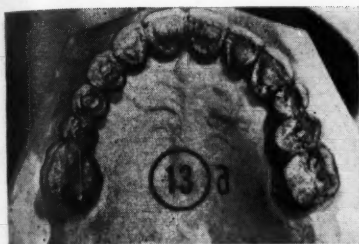
Perhaps the least troublesome and

¹⁰Masler, M.: The Palatal Plate, J. Dent. Children 20:3 (3rd Quarter) 1953.

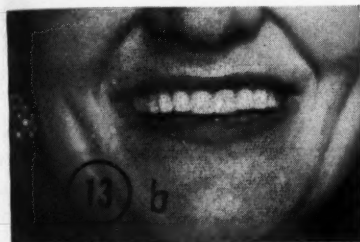


12A. Onlay splints demonstrated, occlusal view.
12B. Anterior projection.

12C. Right projection.
12D. Left projection.



13A. Acrylic veneer crown splint, occlusal view.



13B. Acrylic veneer crown splint in position in mouth.

most serviceable type of fixed multiple splinting is achieved by using full coverage such as is obtained by use of cast crowns or acrylic veneered cast crowns. With the improvements in color control of the veneer, these may be used to advantage in any part of the mouth. Full coverage is superior to the three-quarter crown or mesio-occluso-distal inlay type as the inlays may be jeopardized by recurrent caries or extension of buccal caries. In the opinion of the author there is little to be gained in the use of inlays as it generally is possible to achieve less metal display with the acrylic veneered crown (Fig. 13, A and B).

14A. Preoperative impression.

14B. Acrylic pattern.

14C. Polished splint.

Temporary Crown Splint—The use of fast cure acrylic for a temporary crown splint is of great advantage when it is necessary to defer completion of the permanent crowns or for the purpose of maintaining comfort for the patient when teeth have been prepared. A simplified technique for its use is the following:

1. Take a good alginate impression of the tooth or teeth to be worked on, before starting the preparations. Include at least one or two teeth adjoining to be used as stops (Fig. 14A).

2. If the preparations are for veneer crowns, use a sharp surgical blade and cut off a little of the lingual gingival margin of the teeth to be prepared in the alginate. This additional space will provide a little more bulk in the finished acrylic pattern which can be trimmed later.

3. If the preparation is to be of the full shoulder type, no trimming is necessary.

4. Place the impression in cold water.

5. Complete the preparations.

6. Sterilize the teeth in the usual manner and lubricate the teeth.

7. Prepare a thin mix of the fast cure acrylic material.

8. To hasten setting time, rinse the impression previously taken in hot water; dry thoroughly.

9. Have the patient rinse mouth with warm water.

10. Place the soft acrylic material in the impression at the site of the teeth prepared and force the impression into place.

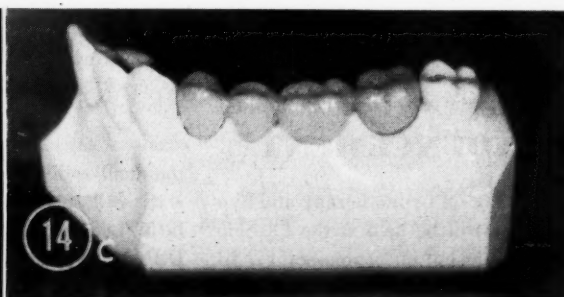
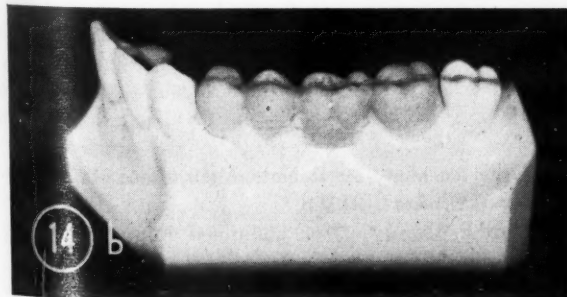
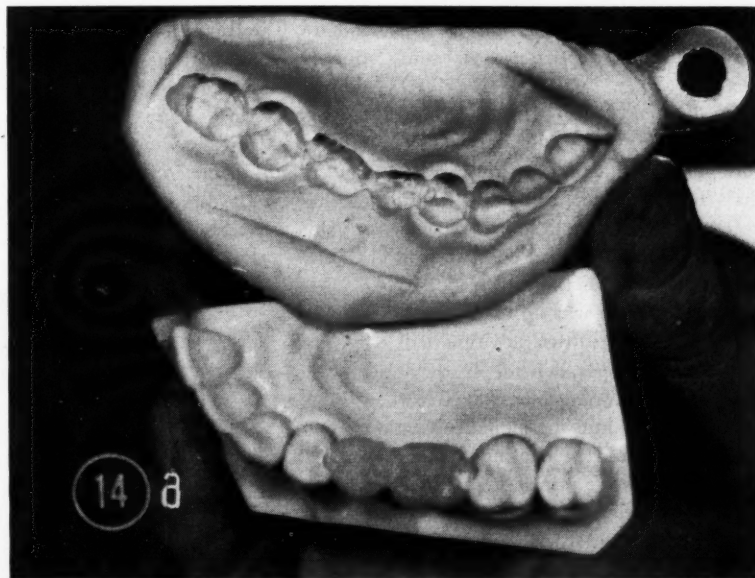
11. Hold in position about 5 to 7 minutes.

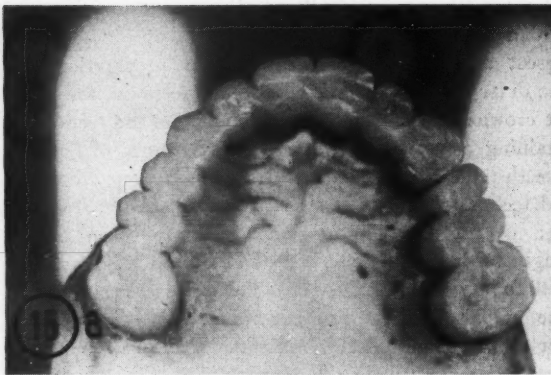
12. Remove the impression.

13. The acrylic (Fig. 14B) pattern may come out with the impression or may be in position on the teeth.

14. Tease the pattern out in either case and trim the gingival acceptably, then polish (Fig 14C).

15. Cement with a temporary ce-





15A. Heat-cured acrylic splint.



15B. Heat-cured acrylic splint in position.

menting medium such as wondrak, mixed with a little vaseline.

16. Usually the temporary acrylic restorations can be easily removed and replaced exactly, as often as necessary, with no further cement needed.

17. If the case planned is for extensive restoration, make preparations two or more at a time as preferred until the entire case is completed.

Heat-cured Splint—If it is expected that a long time will intervene before final completion of the case, it may be desirable to make a more acceptable temporary splint of heat-cured type. In this type, one can also plan some idea of the finished case:

1. A complete wax-up of the teeth individually joined two at a time will afford a test of parallelism.

2. These pairs may be waxed together and tried on the model.

3. This should be continued until all wax crowns are joined as required and tried for fit.

4. The wax pattern is then flaked in large type flask and completed as desired in acrylic in customary fashion (Fig. 15, A and B).

Prefabricated Precision Rests—These are used in connection with multiple splinting (Fig. 16). On occasion, when a tooth is too tipped to line up with the paralleled crowns, the prefabricated precision rest can be of advantage. The author treated a case involving a lower full quadrant embracing the two bicusps and three molars. The third molar was a questionable tooth but its retention was desired for occlusal contact with the counterpart in the upper jaw. A prefabricated rest was employed using the second molar for the female attachment. The case is functioning satisfactorily. Should the third molar

develop difficulty, its removal will not cause loss of the splint.

Conclusion

1. Temporary splinting is of advantage to support loose teeth during the periodontal treatment.

2. Multiple permanent splinting will distribute the masticatory load, so that forces applied to each tooth will be compatible with its physiologic tolerance.

3. Splints will increase the usefulness of abutment teeth and extend their life.

200 Central Park South.



16. Prefabricated rest.

ANNOUNCEMENT

A SEMINAR on hypnotherapy and hypnodontia will be held at the La Salle Hotel, Chicago, on September 17, 18, 19. Seven well-known practitioners in

the field will comprise the teaching staff: Milton H. Erickson, M.D.; Leslie M. LeCron, B.A.; Edward E. Aston, D.D.S.; William S. Kroger, M.D.; Seymour Hershman, M.D.; George

A. Roberts, M.D.; James D. Jacoby, D.D.S.

For additional information write to: Leslie M. LeCron, 8217 Beverly Blvd., Los Angeles 48, California.

Manifestations of TRAUMA in X-Rays

ALEXANDER WEINBERGER, D.D.S., Philadelphia

DIGEST

The progress of periodontics has created an interest in this subject and a need for a better understanding of trauma as it applies to the function of the teeth. Added impetus has come from the renewed interest in occlusal reconstruction.

This discussion is based on x-ray interpretation in this field. The first consideration, therefore, is that the films be of high quality and free of distortions. Correct density is of extreme importance, otherwise the shadows created will be misinterpreted or will be completely obscured. All x-ray interpretation is based on shadows and unless these are represented in their proper light, erroneous conclusions result.¹

Trauma Defined

(1) Forces upon a tooth in a direction or at an angle for which it was not designed to absorb, or (2) a situation wherein the tooth must absorb the stresses and load of adjacent teeth that have been lost have been defined as trauma.

Qualification—To this definition is added the phrase, forces beyond the physiologic limits of tolerance of the tissue, for if no change takes place in the supporting tissue or the tooth itself, regardless of the abnormality, there is no trauma.

Terminology—Box² uses the term, traumatogenic, when the occlusion is

a potential source of disease, and the term, traumatic occlusion, when the disease is manifested.

Factors Leading to Changes—Wolff's law,³ as applied to the physiology of bone, states that any change in the direction or strength of a force will lead to a change in the form and architecture of the bone. Applying this principle to information revealed in the dental x-ray, it is noted that trauma manifests itself in two distinct patterns: (1) a build-up of bone, or (2) a breakdown of bone, the latter being the most common. Each is dependent on the severity of the trauma and the resistance of the host.

Two Forms of Pathosis—In terms of pathosis one is a condensation or hyperplasia of the bone and the other is an atrophy. The variation can be explained by a hyperemia produced by the pressure on the peridental membrane causing atrophy; but if stasis occurs, due to reduced capillaries, deposition of lime salts follows.

Bone Condensation or Hyperplasia

1. Common to multirrooted teeth, bone condensation or hyperplasia results in a complete change in the character of the cancellous pattern and index of illumination as seen in the x-ray.

2. The effect may be so marked as to obscure the detail of root formation (Fig. 1).

3. In the early stages the trabeculae project at a right angle from the surface of the root and appear to ar-

range themselves to support the tooth (Fig. 2).

4. As the trauma persists the trabeculae multiply and there is seen a complete obliteration of the cancellous pattern. This does not prevent any resorption of the alveolar crests.

Results of Trauma—Trauma will cause bone resorption but not necessarily pocket formation which is a collapse of the fibrous attachment. (A) Splinting of teeth, or (B) the use of a tooth as an abutment for a fixed or removable prosthesis changes the function of the individual tooth and subjects it to traumatic influences with resultant alveolar resorption, a fact that is not realized in this day of increased use of fixed dental replacements and splinting of teeth in treatment planning.

Traumatic Technique—1. The first evidence of resorption of the alveolus seems to be a cue for the replacement of a missing tooth, using as an abutment the tooth that reveals evidence of this resorption, or if no replacement is needed, the involved tooth is splinted to adjacent teeth for support.

2. A common practice is to realine the plane of occlusion of a single tooth that has tilted due to the loss of an adjacent member, subjecting the tooth to trauma causing a possible premature loss of the tooth. Figure 3 is a graphic illustration of the problem.

Changes are Pathologic—Dentists in their evaluation of x-rays are prone to consider hyperplastic changes as being of little significance and in some instances they are accepted as a favorable sign. Both types of thinking are wrong. Such changes are definitely pathologic and since alveolar resorption is part of the process it is

¹Weinberger, A.: The Fundamentals of Successful Radiodontic Technique, DENTAL DIGEST 58:438-441 (October) 1952.

²Box, K. H.: Twelve Periodontal Studies, Toronto, Canada, Univ. of Toronto Press, 1940, p. 62.

³Weinmain, J. P. and Sicher, H.: Bone and Bones, St. Louis, The C. V. Mosby Company, 1947, p. 120.

necessary that due consideration be given any such evidence when evaluating the problem.

Atrophy from Trauma

The second type of x-ray evidence of trauma, the atrophic, can be localized or it may exist throughout the jaws. Trauma first produces atrophy. Resorption of the alveolus follows, depending on the severity of the trauma and the resistance of the tissues. Molar and cuspid teeth are better formed and supported by bone; they can, therefore, resist the forces of trauma to a greater extent.

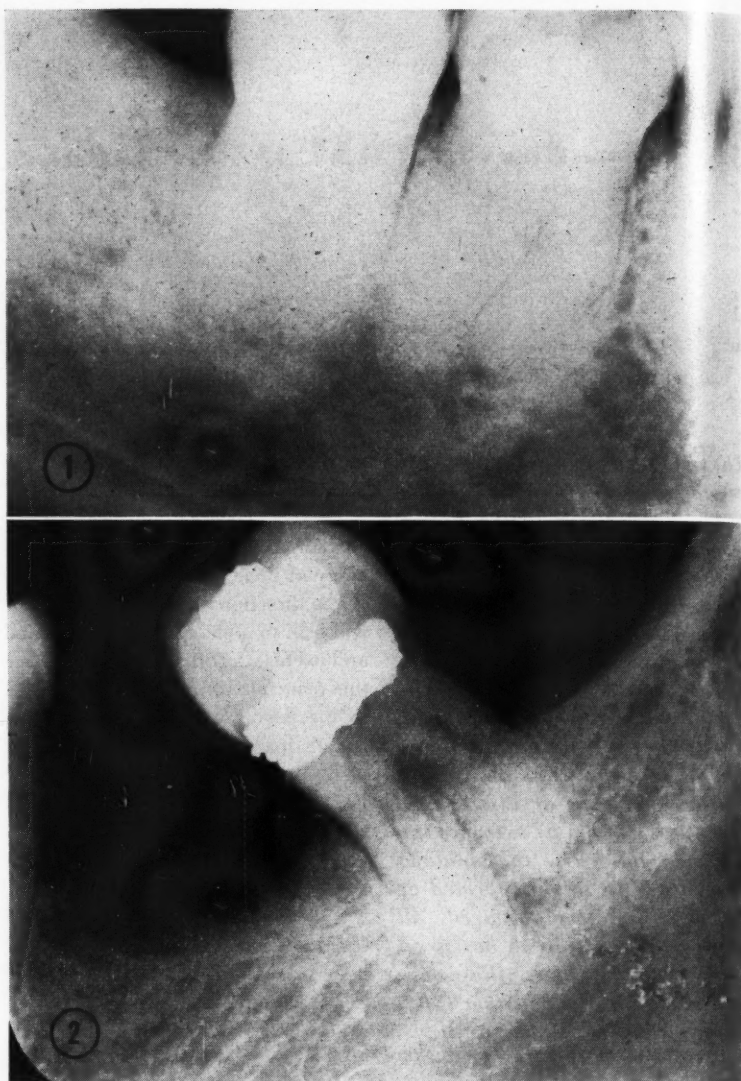
Meaning of Atrophic Changes—From this discussion it is concluded that evidences of atrophic changes in these areas are indicative of a stronger destructive force.

Trauma Revealed by X-ray—The earliest indications of the local type is a widening of the cervical pericementum (Fig. 4). Although this is referred to as an early sign, actually it is a late one since the condition has existed for a long time. The x-ray provides the best means of revealing trauma that is leading to atrophic changes and eventually the loss of the teeth.

Additional Changes Noted — If nothing is done to correct the traumatic state and the resistance of the tissues fails, additional changes take place all or some of which may be seen in one x-ray. These are the following:

- (1) Widening of the cervical pericementum
- (2) Attrition of the tooth
- (3) Thickening of the lamina dura
- (4) Recession of the pulp
- (5) Rarefaction of the interdental septum
- (6) Hypercementosis confined to the middle or distal third of the root
- (7) Breakdown of the crest
- (8) Rarefaction of the supporting alveolus
- (9) Traumatic crescents

Changes More Easily Seen in the Lower Anterior Region—This area, because of the narrow width of the tooth mesially-distally, little supporting alveolus, and thin cortical bone,



1. Condensation of bone obliterating the cancellous pattern that obscures the detail of root formation.

2. Changes in the direction of the formation of the trabeculae to counteract the tilting of the tooth.

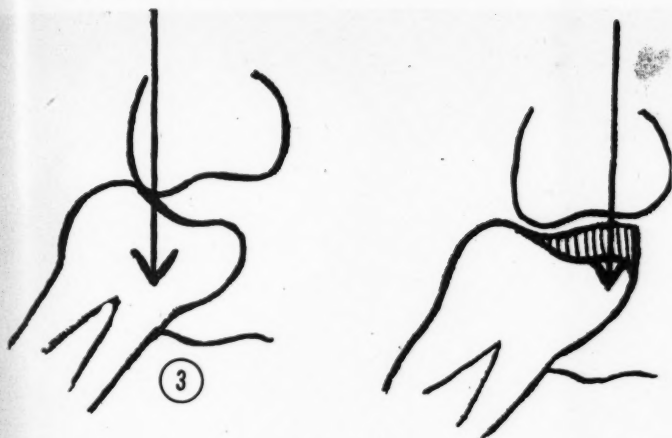
is more subject to traumatic influences, particularly lateral excursions of the mandible. Except for the last all are self-explanatory and easily identified in the x-ray and this one is especially noticeable in the upper anterior teeth (Fig. 4).

Trauma Reflected in X-ray

The forward thrust of the mandible where there is a mandibular overclosure or overeruption of the upper incisor teeth creates trauma and break-

down of the alveolus. The resorbing crest and lingual cortical plate of bone becomes wider labio-lingually and the demineralized tissue is reflected in the x-ray as a crescent-shaped shadow (Figs. 5 and 6). These are referred to as traumatic crescents and they might be misinterpreted as being gingival caries or nonmetallic restorations.

Eliminated by Clinical Inspection—Possible misinterpretation of gingival caries or nonmetallic restora-



3. A diagrammatic representation of the change in the center of gravity and increased leverage created by building up the occlusal level of a tilted molar tooth.

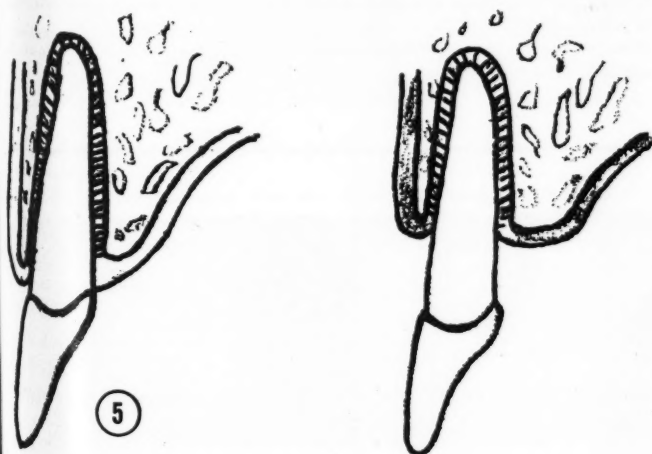
tions will be eliminated by clinical examination. The natural formation of the upper incisor roots is such as to afford these teeth the most support and enable them to resist forces from all directions; nevertheless, there is a weak point and that is the thin labial cortical plate of bone. The anterior component of force driving the mandible forward, together with the traumatic influences of the mandibular overclosure, results in this breakdown.

Evidence of Traumatic Occlusion—In posterior teeth that have bifurcated roots a representation is seen of traumatic occlusion that is worthy of particular emphasis.

Symptoms Noted—1. Usually the patient's chief complaint is pain in



4. On the left is illustrated the first evidences of trauma, a cervical widening of the periodontal membrane. The right film reveals the subsequent atrophic changes of persistent trauma.



5. Lateral aspect of a tooth to show the widening of the crest as the alveolus resorbs.

the tooth, or there may be an ill-defined pain in the region which the patient cannot ascribe to a definite tooth nor can he give anything but the vaguest symptoms.

2. To complicate the problem the tooth may have the smallest restoration or none whatsoever.

3. If there is a large restoration the dentist may be tempted to remove the tooth believing the tooth to be diseased.

4. By examining the septum between the roots changes will be seen in the cancellous pattern resulting in a rounding of the spaces (Fig. 7). These changes in the cancellous struc-

ture have been termed black spotting and where there is trauma these are evident long before there are any clinical symptoms.⁴

5. As the irritation continues breakdown of the crest follows and a small area of rarefaction is visible in the immediate bifurcation. At this stage a blunt probe inserted from the buccal sulcus may go down into the bifurcation, thus establishing the presence of a pocket (Fig. 8).

Evidence Obscured—The superimposition of the lingual root of the upper molar over the area obscures

⁴Weinberger, A.: The Diagnostic Significance of Nutrient Canals, *DENTAL DIGEST* 59:301-303 (July) 1953.

any evidence of such change. It is necessary to be a little more critical of one's technique in the lower; otherwise overangulation in projecting the x-rays may superimpose the parts of the object and conceal the lesion (Fig. 9). In the maxilla it may be necessary to x-ray the object from different angles to visualize the change.

Three Stages—Like many other lesions seen in the x-ray, this is not an early stage but a late one. Glickman⁶ has shown microscopic evidence of breakdown long before there are any x-ray or clinical indications of it. There are, therefore, three stages: (1) microscopic, (2) black spotting, and (3) rarefaction at the crest in the bifurcation.

Since the black spotting can be seen before there is pocket formation, if the occlusion is properly equilibrated a fill-in of bone can be expected and a return to normal.

Black Effect Produced by Trauma—Isolated areas of trauma are seen in the maxilla as daubs of black, the trabeculae are ill defined, and the cancellous spaces become rounded.

The entire spongy pattern, as it is accustomed to be seen in the x-ray, is

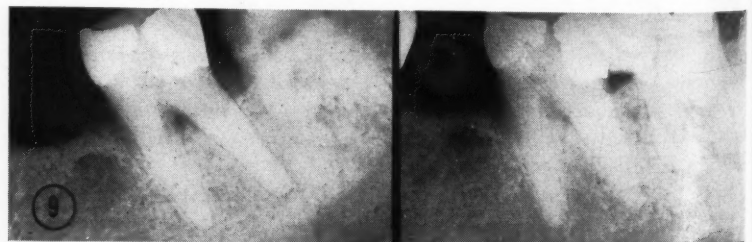
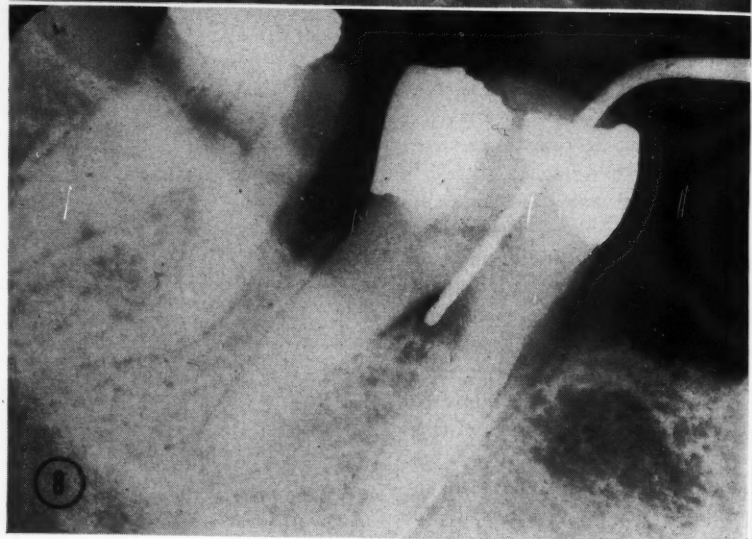


6. Traumatic crescents.



7. Rounding of the cancellous spaces between the roots of a tooth indicative of a traumatic influence.

8. Resorption of the crest in the bifurcation and a probe inserted to establish the existence of a pocket.



9. On the left is seen a rarefaction in the immediate bifurcation that is obscured in the film on the right due to overangulation in the projection.

⁶Glickman, I.: Bifurcation Involvement in Periodontal Disease, J. Am. Dent. A. **40**:528 (May) 1950.



10. Area of black effect on the left side compared to the identical region on the right side.

11. Generalized trauma. Note the distinct dividing line between the density of the supporting alveolus and that in the body of the maxilla.

12. On the right is seen an apical rarefaction following prolonged trauma. This tooth is still vital. On the left is a view of the tooth taken a year prior to the right one which shows resorption of the apex.

destroyed. Because of the thickness of the maxilla, as compared to the mandible, the contrasting effect produced makes it more apparent.

Effect Demonstrated—Figure 10

illustrates a comparison of the right and left premolar areas of the same patient that clearly demonstrates the daub of black effect produced by trauma. This patient has particularly

well-mineralized bone tissue, and except for this one defect there is no change.

Trauma Caused by Improper Biting Habits

A generalized demineralization caused by trauma that is not a result of normal physiologic function but due rather to clenching habits is illustrated in Figure 11. The clenching is a result of a nervous and emotional temperament. The thinning of the trabeculae is caused primarily by a nutritional deficiency and the effect is increased by trauma.

Line of Demarcation Seen—Although there is a general demineralization, if the x-rays are examined closely there can be seen a definite line of demarcation between the density of the area involved in trauma and the density of the alveolus beyond the influence of the teeth. That part of the supporting alveolus in direct contact and influence of the teeth is a shade more dense than that above the apex of the teeth.

Disuse Atrophy—The condition described may be confused with a type of atrophy or demineralization referred to as disuse atrophy, commonly seen in areas where teeth have lost their antagonists or where the masticatory and dietary habits of the subject are such as to provide little stimulus to bone formation. The differentiating characteristic is in the intensity of the illumination of the films. Where there is trauma the density of the x-rays is much heavier than where there is disease atrophy. In addition, where there is disuse atrophy, the pattern of the spongy bone is basically normal except that the cancellous spaces are larger and the trabeculations are finer and lace-like.

Improper Biting Forces Transferred—The effect as seen in the alveolus has been examined, but if the resistance be adequate, the forces are passed on to the tooth and the pulp becomes involved. First there is hyperemia and then follows infection from bacteria picked up from the blood stream if the irritating factors are not removed (Fig. 12). This tooth is still

vital. The area of rarefaction is caused primarily by the traumatic effect, producing pressure atrophy of the tooth which is mobile.

Root May be Absorbed—The tooth is more resistant to resorption than bone and the usual pattern is for the bone to resorb, but instances are seen where the root end is resorbed along with the alveolus. There is the possibility that the root resorption came first although we have never seen any instances that revealed root resorption without traumatic changes in the alveolus. Root resorption offers no difficulty of recognition (Fig. 13).

Fracture of the Root—Although rare, fracture of the root can be a result of occlusal trauma. These teeth remain vital for many years even though the occlusal half of the tooth is extremely mobile. Such fractures are common to lower anterior incisors where there is attrition of all the teeth (Fig. 14). When a fracture of the root is suspected it may be necessary to displace the tooth slightly and while holding this position, x-ray the tooth. This will spread the fracture and separate the parts of the tooth.

Trauma as Basic Etiologic Factor

The cementoma is included in the discussion because in literature one finds that trauma is presented as the basic etiologic factor. It is believed by the author that something other than this is the cause, especially since there are three stages in the history of the lesion: (1) a rarefying, (2) a calcifying, and (3) a mature or completely calcified stage. All three are sometimes seen in one patient on various teeth (Fig. 15).

Second Feature—The following is a purely clinical observation: the lesion is found to be predominant in the Negro woman. It is a little difficult to conceive that there can be a traumatic effect so different in its nature that it would produce this distinct entity without thinking in terms of some underlying systemic influence.

Unknown Factor Involved — Is there some force acting on the bone formation that makes possible the



13. Root resorption. This followed splinting of the teeth.

14. Traumatic fracture of the root due to occlusal trauma. The fracture is clearly defined in the right view of the cuspid.

15. Cementoma. All three stages are evident in this patient.

creation of a cementoma, that exists primarily in the Negro woman? Although no statistics have been kept, it has been the author's experience that more than 85 per cent of the lesions of this type that have been seen, have been in this group. For this reason trauma is not accepted as the underlying etiologic factor. As literature on

the subject almost universally presents cementoma as a lesion of traumatic origin, it is presented in this discussion.

Conclusions

1. Hyperplasia or condensation of bone as a result of trauma involves no problem in differential diagnosis.

2. Atrophic changes are more involved and must be differentiated from areas of rarefaction caused by pulp disease, demineralization from dietary deficiencies, systemic diseases, systemic infections, alveolar resorption of systemic origin and disuse atrophy. Thus what appears to be a simple problem can become an extensive one in differential diagnosis.

3. Trauma will cause resorption of

the alveolus and will have an effect on the nutritional influences of the bone, but one must not be misled into considering all evidences of atrophy or hyperplasia as having trauma as the basic etiologic factor.⁶

4. Man may temporarily clear a

⁶Weinberger, A.: The Influence of the Ca/P Ratio on the Classification and Treatment of Bone Resorption in Periodontal Disease, *J. Oral Surg., Oral Med. & Oral Path.* 6:295-301 (Feb.) 1953.

jungle but unless he has overcome the forces of nature that created the jungle, it will return. If the health of the dental tissues becomes impaired, the normal functions of mastication become potential sources of trauma. It is extremely important, therefore, that added emphasis be given to all possible etiologic factors.

1002 Medical Arts Building

The Management of Maxillofacial War Wounds

JAMES E. CHIPPS, Lieutenant Colonel, USA (DC), ROBERT G. CANHAM, Captain, USA (MC), and HARRY P. MAKEL, Major, USA (MC)

Primary Closure

Most authorities prefer conservative debridement of contaminated facial wounds followed by immediate closure to a more radical excision of suspected tissue followed by immobilization of the open wound. This technique was advisable prior to the advent of modern chemotherapy.

Advantages of Early Closure—(1) When properly repaired in the first twenty-four hours and supported by adequate chemotherapy, the maxillofacial wound usually heals promptly with minimal scarring. (2) Early closure of a severe wound greatly improves the patient's morale. If treatment is delayed, the average patient is depressed by the appearance of his facial wound and must undergo painful dressing changes, debridement, and unnatural methods of feeding.

Disadvantages of Early Closure—Although the advantages of an early closure are undeniable, about 30 per cent of wounds involving the mouth which had been primarily repaired were seen to break down in whole or in part. The causes of such breakdowns were the following:

1. *Tight closure of wounds without provision for deep tissue drainage.* The accumulating fluids materially add to the tension on the wound edges, causing necrosis and breakdown.

2. *Inadequate use of bandage.* Be-

sides immobilization of the wound, a properly applied bandage minimizes the accumulation of edematous fluids which add to tension on the wound edges.

3. *Failure to treat the oral surface of a wound.* The deep tissue and skin of many wounds were properly sutured but the oral mucosa had been left friable and unsutured, permitting intrusion of oral fluids, tongue movements into the open wound, and accumulation of fermenting food debris.

4. *Secondary hemorrhage.* In four patients breakdown of repairs was attributed (1) to profuse secondary hemorrhage from unligated major blood vessels, or (2) to the result of surgical intervention to control hemorrhage.

5. *Secondary manipulation of the repaired wound.* Though not a direct result of primary repair, a frequent cause of breakdown was secondary manipulation, usually for reduction of a fracture. Most fractured mandibles associated with infected wounds remained sufficiently mobile for ten days after injury to permit the use of simple methods of closed reduction. After that period, reduction methods were necessarily more complex.

(Example: If a soft tissue wound had been repaired without provisions for fracture reduction, and if the wound had not sufficiently healed within ten days, a secondary opera-

tion to reduce the fracture frequently precipitated a breakdown of the wound repair. This could be prevented by adequate reduction and immobilization at the time of primary wound repair. Such procedures need not be complex. If a fracture is generally aligned and moderately immobilized, the receiving surgeon can afford to await wound healing before constructing a definitive fracture fixation gear.)

6. *Inadequate chemotherapy.* Though some degree of infection was expected in contaminated wounds, it was often found following wound breakdowns through culture and sensitivity studies that the contaminating microorganisms were resistant to the antibiotic drug being used.

Summary

The early closure of a contaminated maxillofacial wound is not contraindicated, but the success of such a closure is directly proportional to the attention paid to (1) standard surgical principles of debridement, (2) hemorrhage control, (3) proper suturing, (4) maintenance of drainage, (5) adequate use of bandages, and (6) giving adequate chemotherapy.

Adapted from *United States Armed Forces Medical Journal* 4:953-954 (July) 1953.

Removal of an Impacted Cuspid

with MAXILLARY SINUS INVOLVEMENT

EUGENE V. LINSEY, D.D.S., Cleveland, Ohio

DIGEST

The case described in this article is not spectacular but it is a case that involves a fairly common problem. Antraoral communication is a problem that is encountered in all practices; its occurrence after an ordinary extraction, however, is rare. This case history demonstrates that in certain circumstances the cuspid extraction may involve the maxillary sinus.

Case History

The patient was a twenty-three-year old male.

Results of Oral Examination—(1) A retained deciduous upper right cuspid was revealed, and (2) the crown of the permanent upper right cuspid could be palpated on the palatal surface, and was apparently lying just over the apical area of the retained deciduous cuspid.

1A. Occlusal view.

1B. Intraoral x-ray view.

Roentgenologic Examination—X-ray examination showed (1) that the root of the deciduous cuspid had been entirely resorbed, and (2) that the crown of the impacted cuspid appeared to be lying quite superficially. The root of the impacted tooth was not visualized on the x-rays (Figs. 1a and 1b).

Surgical Procedure

1. Under local anesthesia an incision was made distal to the upper right first bicuspid. The palatal tissue was elevated toward the midline. The flap was held mesially by means of a suture that was anchored to the



left side of the arch. The crown of the impacted tooth was immediately visualized.

2. The long axis of the tooth appeared to run in a posterior line, parallel to the arch formed by the bicuspid and molar teeth. A hand mallet and chisel were used to dissect the bone overlying the root.

3. As more bone was cleared away it was noted that the root was not straight but that it curved upward toward the maxillary sinus in a nearly vertical line.

4. The bone surrounding this section of the root was also removed and an attempt was made to dislodge the tooth. The tooth remained firm; bone dissection was continued.

5. As the overlying bone was removed the apical one-third of the root was brought into view. It was noted that the apical one-third showed a definite lingual curvature; it was therefore necessary to free the apex.

6. The tissue floor of the maxillary sinus was exposed and the root was gently elevated. As the tooth was brought downward the soft floor of the maxillary sinus was found to be adherent to the root tip and was removed when the tooth was extracted. The resulting opening into the maxillary sinus was approximately 5 millimeters in diameter.

7. The area just below the oral-maxillary sinus junction was carefully debrided. The wound was dusted with sulfathiazole-sulfanilamide powder and the palatal flap was sutured into position.



2. Two-year postextraction view.

Considerations in Treatment

The patient's postoperative course was uneventful and x-ray pictures taken two years later showed complete healing of the area. (Fig 2). In cases with such maxillary sinus involvement, if there is no history of acute preextraction infection, it is believed that conservative and cautious treatment is the treatment of choice:

1. Manipulation superior to the oral-maxillary sinus junction should be withheld unless there have been fragments forced into the sinus.

2. The alveolus should be care-

fully trimmed and all spicules of bone removed.

3. Sulfa powder and penicillin may be dusted into the area; the area should then be sutured and tightly closed.

4. The patient should be given postoperative directions: (1) biting on a dry sponge for the next day or two will permit the clot a more favorable chance to form. (2) The patient should be warned that in the event of sneezing the nares should not be held closed but should remain unobstructed. (3) The patient is instructed to forgo vigorous mouth washing for thirty-six to forty-eight hours.

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Research Report

on the REPLANT-IMPLANT

of Individual Teeth

WILLIAM I. OGUS, D.D.S., Washington, D.C.

DIGEST

In the improved technique described in this article a Vitallium thimble is cast and cemented over a prepared root to prevent absorption. With this addition a replant becomes a replant-implant. It is hoped that a temporary replacement, as the implant is known, will become a permanent replacement.

General Considerations

Replanting, implanting, and transplanting of teeth have been done for hundreds of years. The implants are mechanically retained by the growth of connective tissue fibers which encircle the tooth and hold it firmly. In many reports studied during the past fifty years the teeth have remained in function for over ten years.

Length of Time Uncertain—It is difficult to predict the length of time implanted teeth will function in the arch. Eventually the roots will absorb leaving only the crown intact. The crown is not sufficient to support the replant and must be removed or it will extrude.

Expedient in the Young Patient—In the young patient, aged 7 to 14, the loss of a tooth by accident is a catastrophe. The replant is an expedient manner of replacement. It aids in space retention as well as function and has served in many cases until permanent replacement could be made. It is expected that by casting and cementing a Vitallium thimble over the prepared root the process of resorption will be arrested.

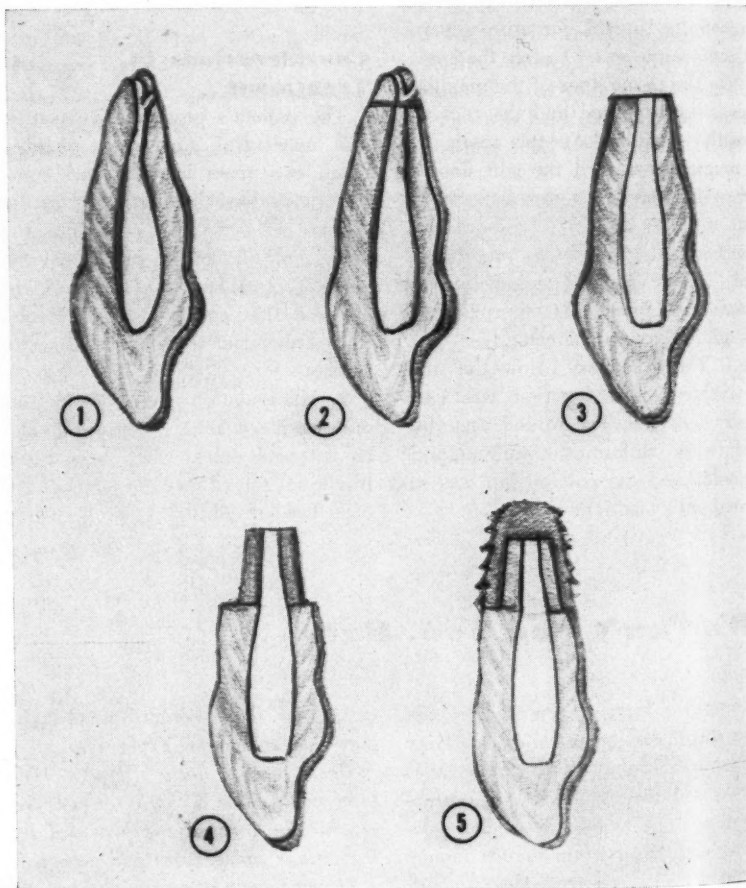
Author's Note: The Vitallium implants used in the cases described in this article were furnished by Austenal Laboratories, Inc.

Historic Aspects Of Technique

The surgeon, John Hunter,¹ who practiced between 1750 and 1790 seems to have given special attention

¹Black, G. V.: Special Dental Pathology, Ed. 2, Chicago, Medico-Dental Publishing Co., 1920, pp. 45, 46, 47.

to the teeth, including transplanting and implanting teeth. The operation became popular in Europe during the latter part of the 18th century but was soon discarded. The technique was not, however, original with Hunter. Even after the beginning of the 19th century the transplantation of teeth was practiced in France and perhaps elsewhere.



1. Appearance of extracted tooth, cuspid or bicuspid.
2. Removal of apical area.
3. Reaming of root canal.
4. Filling of root canal; preparing apical section of root.
5. Casting of Vitallium thimble.

Nomenclature

During the recent revival of the implant technique a nomenclature was established for the different operations:

Replantation—The term used when teeth are extracted purposely or by accident and replaced in their own sockets.

Transplantation — When a substitute tooth is placed in the socket of a tooth just removed.

Implantation—When the teeth have been removed at some former time and a new socket is cut in the residual alveolar process or ridge and a substitute tooth or metal is planted into the socket.

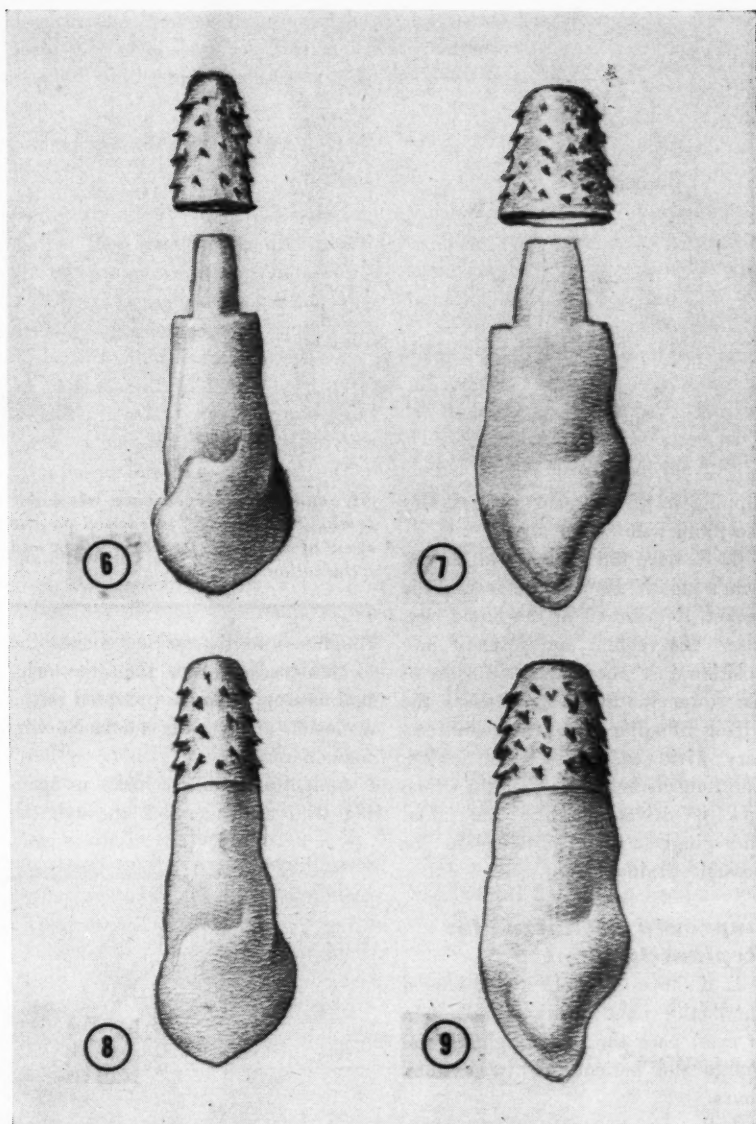
Technical Factors

In replantation and transplantation² of a tooth which is freshly removed from its socket as much as possible of the periosteum of the alveolus and of the periodontium of the tooth should be preserved. Such teeth must not be sterilized before replantation; they should be preserved in physiologic salt solution at body temperature. The alveolus is washed with a warm saline solution or a 5 per cent colloidal silver solution, but no irritating antiseptics should be used. After the operation the mouth must be kept clean.

Use of Metals

Experiments on animals and human beings have established the existence of alloys that are electrically neutral, to which bone will attach and fill spaces, and to which tissue will adhere. The author has conducted research in techniques to surround the roots of teeth extracted for replant-implantation to prevent root absorption and create a permanent replacement.

In the selected cases of replantation infection has been no problem. If a replant has functioned for two to ten years it must be considered a successful operation. If the only cause for lack of success is that of absorption, it is hoped that the addition of a Vitallium thimble covering the root will prevent this absorption.



6 and 7. Appearance of preparation and Vitallium thimbles.

8 and 9. Cemented thimble, sterilized, ready for the replant-implant.

Technique for Replantation

In considering a tooth for replant the study of osseous structure is extremely important. The socket formed by the alveolus should be fully preserved. If this socket is injured during extraction of the tooth failure occurs before the replant is completed. In the molar and bicuspid sockets the interproximal septae are carefully removed. The following steps are taken:

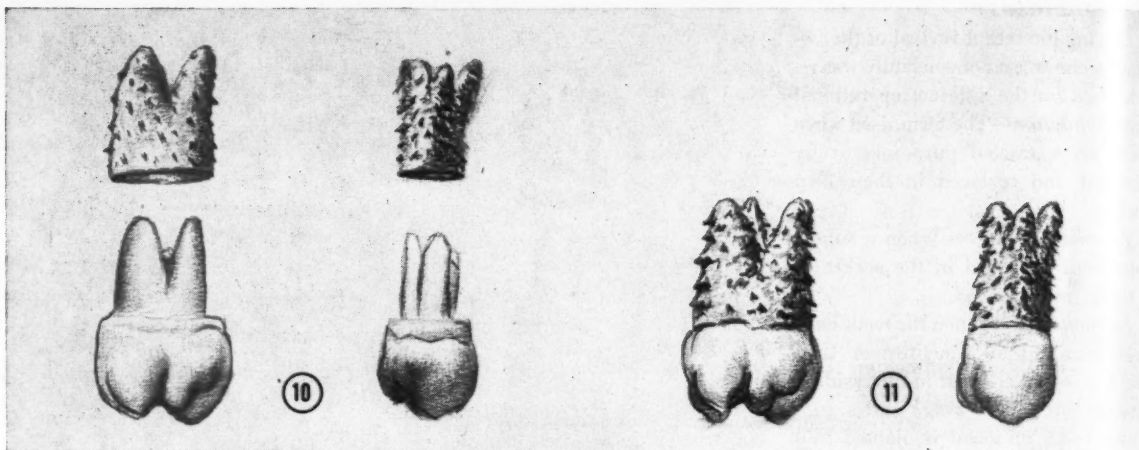
1. Remove the tooth under local

anesthesia; avoid injury of the socket. Remove any granulomata or cyst present and allow the patient to bite on gauze.

2. Remove the apical section of the root; open and ream the root canal from the apex. Sterilize the root canal; fill the canal with a gutta-percha point and chlora percha paste. Prepare the apical area with an inverted cone bur and fill with copper amalgam; polish the restoration.

3. Sterilize the tooth by placing it into hydrogen dioxide followed by

²Blair, V. P.: *Surgery and Diseases of the Mouth and Jaws*, Ed. 2, St. Louis, C. V. Mosby Company, 1913, p. 81.



dipping in 95 per cent alcohol. Dry the tooth with warm air.

4. Remove the gauze from the patient's mouth. Pack gauze around the socket. Remove all of the blood clot, insert the replant and force it into position just above the occlusion of the lower tooth. In most cases the wiring of adjacent teeth is unnecessary; wiring can be used when needed. The tooth is held firmly and a Crane pick is driven through the labial and gingivae and labial plate for possible drainage.

Improved Technique for Replant-Implant

1. Remove the tooth under a local anesthetic; remove any granulomata or cyst; pack the socket lightly; discharge the patient for twenty-four hours.

2. Remove the apex of the root; open the root canal by reaming; sterilize the tooth and root canal; fill the root canal with chlora percha and a gutta-percha point.

3. Grind the root circumference about 2 millimeters to a point about 2 to 3 millimeters above the neck of the tooth, creating a shoulder. Wax and prepare a Vitallium thimble casting. Resterilize. Place the tooth in a normal saline solution.

4. The metal thimble is cemented on the prepared root.

5. In twenty-four hours the patient is again anesthetized locally; the tooth isolated by a gauze dressing; the blood clot is broken up and removed. The replant-implant is inserted by forcing it into the socket. The

10 and 11. Appearance of molar tooth. The thimble is carried to the neck of the tooth to cover roots and trifurcation.

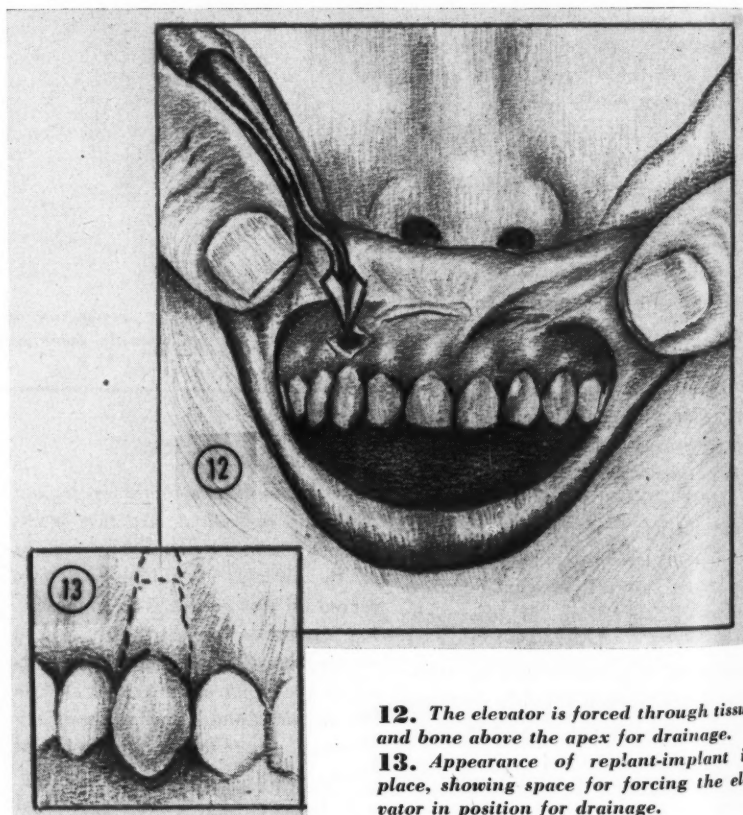
roughness in the casting makes the circumference larger than the original casting. Relief is provided to the occlusion of the lower tooth. No wiring is necessary.

6. It is advisable to make an opening with a Crane pick through the

tissue and labial or buccal plate, above the apex of the root so that drainage will be possible.

Comment

In planning the replant-implant technique it is essential that the osseous structure forming the socket is studied. It is important that the socket is intact after extraction. Should the labial or buccal plate be dislodged it must be replaced in position.



12. The elevator is forced through tissue and bone above the apex for drainage.

13. Appearance of replant-implant in place, showing space for forcing the elevator in position for drainage.

Conclusion

Replanted teeth have been shown to become firm in the socket. The de-

fect in the replant techniques has been that of absorption. It is hoped that by adding the Vitallium thimble

described absorption of the root can be prevented.

1832 Eye Street, N. W.

Temporomandibular Joint Disorders

EGGEN SVEIN, Lillehammer, Norway

Summary

Information has been assembled from 136 patients with temporomandibular joint disorders concerning occupation myalgia or pains in the back, shoulder, occiput, arm, or leg, together with possible previous treatment for such disorders. The summary of information includes the following:

1. Thirty-three of the patients had come for treatment of jaw joint disorders only, and represent a group (group A) where these were more serious.

2. One hundred three patients came for ordinary dental treatment (group B), and the jaw joint disorders were ascertained on the basis of clinical examination. Temporomandibular joint disorders here means that one or more of the following symptoms were found: (1) Sensitivity upon palpation of the jaw joint, (2) pains in the joint, and (3) clicking.

3. One hundred twenty-nine persons investigated by questioning alone; namely, 51 students at an academy (group C) and 78 nurses in a hospital (group D). On the basis

of information from the questionnaires, these groups were divided into the subgroups c (9 persons), and d (12 persons, representing 21 persons with temporomandibular joint disorders, further into the subgroups c' (42 persons) and d' (66 persons), representing 108 persons without evident symptoms of such disorders. Temporomandibular joint disorders in these groups means that the patients were aware of clicking or pains in the jaw joint.

4. Altogether this material represents 157 persons with temporomandibular joint disorders and 108 persons without evident symptoms of such disorders. In the first of these two groups 37 per cent of the persons had previously undergone treatment for occupation myalgia or pains in the back, shoulders, occiput, arm, or leg, while in the latter group only 6 per cent of the patients had undergone treatment for such symptoms. There would seem to be a close connection between temporomandibular joint disorders and pains in the back, shoulder, occiput, arm, or leg. As there is frequently an important

psychic contributive causative factor to the symptoms mentioned, the same may be the case with temporomandibular joint disorders.

5. The damaging influence on the temporomandibular joint is above all assumed to be occasioned by hyperfunction of the chewing muscles. Distinct abrasion facets were to be found on the teeth of all the 136 patients who were clinically examined. It is assumed that such abrasion facets are caused by clenching or grinding habits resulting in contact friction between meals, rather than by chewing food, as modern food substances minimize rather than increase friction between the teeth. Habitual locking of the mandible in a protrusive position was also observed.

6. This investigation does not exclude malocclusion as a causative factor of temporomandibular joint disorders, but it seems to indicate that mechanical therapy in itself is not a totally adequate procedure.

Adapted from *Den Norske Tannlaegeforenings Tidende* 64:130-131 (April) 1954.

Metastatic Carcinoma in Cervical Lymph Nodes

WALTER W. CARROLL, M.D.

THE EFFICACY of a well-planned and well-timed nodal dissection in the treatment of metastatic carcinoma in cervical lymph nodes cannot be denied. However, there continue to be many questions as to when and to what extent it should be employed.

Radiation therapy does not eradicate metastatic carcinoma in the cervical lymph nodes even though it may have controlled the primary lesion. Block excision techniques therefore are employed as a separate procedure when the cervical nodes become palpably enlarged.

Thus a dissociated homolateral complete neck dissection has been used in the treatment of metastatic carcinoma from the following primary sites in the tissues of the head and neck: the skin, the lip, the buccal mucosa, the upper gingiva, the hard palate, the anterior two-thirds of the tongue, and the floor of the mouth.

Because certain primary carcinomas of the head and neck are not satisfactorily controlled by radiation therapy, a more aggressive plan of surgical excision has developed to better our survival rates.

This has resulted in the introduction of the so-called "incontinuity resection" including the primary tumor, the collecting nodes and the intervening soft tissue and/or bony tissues, which are excised en bloc.

Such operations result in relief of pain in virtually all cases, and the saving of life of many. These accomplishments justify the deformities which unavoidably follow such operations.

From *Proceedings of the Institute of Medicine of Chicago* 20:95-96 (April 15) 1954.

NUTRITIONAL FACTORS

*in the Maintenance of Bones and Teeth**

CLIVE M. McCAY, Ph.D., Ithaca, N. Y.

Reason for Opposition to Soft Drinks

We are much concerned at present with acid erosion from beverages because of the ever-increasing use of soft drinks such as the cola beverages that have a pH of 2.6 or lower. The sale of soft drinks is now said to exceed three-quarters of a billion dollars per year. Nutritionists have been opposed to soft drinks and other products rich in sugar because these substances provide only calories and supplant natural foods that provide minerals, vitamins, and protein.

Wholesome Food Displaced by Sugar—If our agriculture were aware that every pound of sugar eaten by Americans displaces five or six pounds of wholesome foods such as milk, potatoes, and apples from the table, there would be a minimum enthusiasm for the importation of sugar.

Use of Fresh Milk Could be Increased—If we reduced our consumption of sugar to a reasonable level of about thirty pounds per capita per year, we could nearly double our present use of fresh milk.

Studies Conducted in Navy

In 1943 studies were started to determine the amount of food consumed by men outside the regular messes of the Navy. The average man eats about one-sixth of his food outside the mess. This amounts to 400 to 600 calories per day and illustrates the importance of substances purchased and eaten.

Cola Beverages Extensively Used—

It was discovered that the cola beverages extensively drunk in the Navy contained substantial amounts of phosphoric acid, caffeine, sugar, dye-stuffs, and flavors.

Immersion in Cola Beverage Softened Teeth—The studies at the Naval Medical Research Institute disclosed that extracted human teeth softened after immersion for a few days in cola beverage. The solution rate is slow.

Factors Influencing Erosion of Teeth

In studying the erosion of teeth by acids three factors must be considered, (1) the hydrogen ion concentration, (2) the titratable acidity, and (3) the nature of the negative ion. The same factors influence the taste of acids.

Titratable Acidity Decreased by Addition of Water—If an acid solution such as a cola beverage is diluted with water by the addition of regular amounts, the pH will not change much but the titratable acidity decreases in proportion to the addition of water. After substantial dilution one can hardly taste the acid although the hydrogen ion concentration has decreased less than one pH value.

Anions Play a Part—Citrate seems to promote more erosion than sulfate when the acid factors are similar. Many studies have indicated that erosion is marked if the pH is lower than 3.5 and there is enough titratable acidity.

Buffering Power of Mouth—A simple test of the buffering power of the mouth consists of having a person hold in the mouth 10 milliliters

of a solution resembling a cola beverage containing 10 per cent sucrose and 0.055 per cent phosphoric acid. After this is held in the mouth for a half minute, the hydrogen ion concentration can be measured either by the use of a universal indicator, or by the glass electrode.

Test is Fair—Because the mouth is seldom given this much opportunity to buffer an acid solution before it strikes the teeth and is swallowed, this test seems to be fair to the beverage.

Some mouths can buffer very little and the solution may leave the mouth at a pH of 2.3. Others can buffer effectively and the end value may be 5.6. As a rule men can buffer better than women.

Animal Experimentation

In the course of about eight years several animal species were used for tests of erosion by cola and other acid beverages. These included mice, dogs, rats, hamsters, guinea pigs, and monkeys. Monkeys were used because they drink much like man and can be taught to drink from a cup. All species suffer erosion of the molars from acid beverages.

Erosion of Molars—In the case of rats, ten milliliters or about a third of an ounce drunk one time produces detectable effects under microscopic examination by an expert.

Comparative Effects—(1) If rats are given no other fluid than one like a cola beverage but are fed a complete diet, the molar teeth are eroded down to the gingival margin in about six months. (2) Rats fed citrus fruit juices and tomato juice in comparable amounts suffer only moderate erosion from the fruit juice and very little from the tomato juice. (3) No erosion is found in rats fed water.

*Presented at the 83rd Annual Meeting of the Dental Society of the State of New York, Buffalo, N.Y., May 10, 1951. The research summarized in this report was supported in part by a grant from the U. S. Public Health Service, in part by a grant from the dental branch of the Office of Naval Research, and in part by a grant from the Rockefeller Foundation.

Effects of Fruits vs. Juice in Erosion—Recent studies indicate that juices from grapefruit, pineapple, guava plum, and green mango may produce moderate erosion of the teeth of rats but that the fruit from which the juices were prepared causes little or no erosion. This should interest those who advocate eating fruits for the cleansing of teeth at the end of meals in comparison with those who drink juice at the start of a meal.

Substances Preventing Acid Erosion—Substances offering possibilities of preventing acid erosion include the following: (1) Fatty acids, such as stearic, phytic acid which is found in bran and ties up calcium, oxalic acid, and fluorides. (2) The most useful discovered thus far is oxalic acid at a level of one part per thousand of solution. No erosion results if equal parts of rhubarb juice are mixed with lemon juice. The oxalic acid must be in the solution, however, or it is not very effective. (3) Fluorides offer some protection against acid erosion if they are used in beverages at levels of one to 5 parts per million. Fluorides in substances such as bone meal afford no protection.

(Among the common beverages that produce no erosion are beer, root beer, and cultured milks.)

Solution of Other Substances in Acid Beverages—It has been asked if cola beverages would dissolve nails. The claim has been made that a nut rusted to a bolt can be loosened by pouring cola beverage over it. These questions may be of some interest in relation to the loss of fillings.

Use of Oxalic Acid in Beverages—The protective action of oxalic acid against erosion by acid beverages does not arouse enthusiasm among nutritionists who would prefer a marked decline in the use of such beverages, whether or not they affect teeth. The displacement of wholesome foods may be a much greater evil than effects upon teeth.

Toxicity of Oxalic Acid—Oxalates are common constituents of many foods such as rhubarb, cocoa, beet greens, and spinach. If diets are unbalanced in regard to vitamin A there is some evidence that oxalates may

stimulate the formation of urinary calculi.

No Waste From Moderate Amounts of Oxalate—Newer studies indicate that moderate amounts of oxalate waste no additional calcium in the case of human beings because the percentage of the calcium assimilated from a diet is usually less than thirty.

Effects of Age on Calcium Assimilation—Studies with animals indicate that the stage of the life span determines whether or not calcium is lost if the food contains oxalate. From about one hundred days of age until rats are two-thirds through the span of life, oxalates seem to have little effect on calcium assimilation.

Assimilation During Last Third of Life—Testing with old animals indicates that there is poorer utilization of other insoluble forms of calcium such as the phosphate or the sulfate found in substantial amounts in American bread.

(Milk calcium seems equally well absorbed at all ages by both animals and man.)

Study of Exclusive Milk Diet—In a large group of experimental white mice fed nothing but fresh cow's milk supplemented with traces of iron, manganese, copper, and iodine with a small amount of cod liver oil from birth to death in old age no carious teeth were found. An average of two or three carious molars was found in the hundred and eighty control animals in this study who were fed complete stock diets.

Denser Bones with Milk Diet—The rats in this study with sound teeth had somewhat denser bones than those fed the complete stock diet. This gives some hope that ways may be discovered for the maintenance of stronger bones in later life.

Factors in Maintenance of Bone

There are many recognized factors in the maintenance of bones in the latter half of life: (1) The dietary variables such as calcium, phosphorus, fat, vitamin D, and the specialized proteins provide the matrix to hold the inorganic substances of bone. (2) Connected closely with the elements

of diet are physical factors such as exercise. (3) Endocrine factors are important such as those of the thyroid and parathyroid.

Calcium Metabolism in Old Animals—From laboratory study of exercise and its influence on the calcium metabolism of old dogs, the evidence is that animals begin to have difficulty in maintenance of the calcium of their bodies after they pass the two-thirds marks in the span of life. For man the equivalent age is forty-five to fifty years. Because most of the calcium of the body in every species of animal is held in the bones, the calcium balance is an indicator of whether or not the bones are disappearing.

Endocrine Factors Influenced by Diet—If a diet is adequate in utilizable calcium such as that from milk, the deteriorating effects of the parathyroids are much less evident.

Sex Difference in Calcium Metabolism—Women after the menopause are known often to lose much calcium and to develop specially shaped vertebrae. This condition seems to be unknown in men during the same period of life.

Although the female rat has an average span of life greater than the male, female rats commonly have much more calcification of the kidney tissues than the males that were litter mates and fed the same diet for the entire life span.

Denser Bones in the Female—The female rat that has a longer span of life has denser bones at the end of life than the males if these females have never been bred. These sex differences occur in many phases of nutrition and pathology but remain unexplained.

Dentists Aid in Distributing Knowledge

The dentist plays a conspicuous part in his community in putting to use the best knowledge in nutrition. The following are some of the ways in which the dentist can make available to the public the most recent information concerning nutrition:

Visual Evidence of Caries—Extracted teeth saved for use in studies

of acid erosion were embedded in bioplastic and exhibited in country schools. The children were interested in seeing how carious teeth really look.

Soft Drinks Banished in Some Places—No profession has taken a more active part than dentists in the problem of getting children to spend their money for milk and beneficial foods instead of candy and soft drinks. Advances in this connection have been made. Some states have ruled soft drinks out of their school buildings.

Milk-Dispensing Machines—During the past year a program of testing milk-dispensing machines has been in progress at Cornell. The in-

stallation of milk machines in schools would give soft drink dispensers effective competition. In time it may be possible to use the profits from such machines to pay the capital costs so that many schools and factories can have them.

Taxation of Soft Drinks Considered—Substantial taxation for soft drinks would seem of value to make it possible for natural foods to compete with bottled sugar solutions.

Investigation of Chemicals in Foods—In the current congressional hearing on chemicals in foods attention has been devoted to the possibility of having declaration of contents on every bottle of soft drink. Extension of this open formula labelling to such

common foods as bread would enable the mother to learn the amount of milk in bread and the amount of caffeine in cola beverages.

Public Education From Reading—The conventional nutrition text is deadening and not suitable for the dental patient. Perhaps special material could be prepared by a committee of dentists such as the booklet of the Bureau of Medicine of the Navy entitled *Feel Alive*. This booklet has a double page called *Rogue's Gallery* in which an accusing hand is pointed at pie, soft drinks, and candy.

Adapted from *New York State Dental Journal* 17:429-435 (November 1951).

The Porcelain Jacket Crown

JOSEPH E. EWING, D.D.S., Philadelphia, Pennsylvania

Tooth Preparation (General)

1. Complete the preparation during one visit. Partial preparation, carried out over several visits, will only produce a hypersensitive tooth which may carry over even after cementation.

2. Avoid creating excess heat during the preparation. Allow adequate time for all preparations. There is no need to complete a preparation within fifteen to thirty minutes.

3. Be thoroughly prepared with several good radiographs of the pulp. Make these exposures at various angulations so as to determine pulp size, shape, and position.

4. Carefully, by digital means, test the mobility of the tooth. At the same time test the movement present during the various occlusal excursions. This can be accomplished by holding your index finger lightly on the labial surface of the tooth and instructing the patient to go through the various mandibular excursions. Any movement of the tooth will be felt by the finger.

5. Observe the type of occlusion present with special emphasis on the

degree of vertical and horizontal overlap. Do not plan the treatment of any tooth unless there is some degree of normalcy in occlusal relations. If there are occlusal adjustments to be made, do them at this time to avoid embarrassment during insertion and cementation.

6. Do not neglect to determine the vitality of the tooth prior to operative procedures, as nonvital teeth will frequently flare up under treatment, and planning will have to be changed.

7. Carefully consider the age of the patient, and the tolerance of the pulp and periodontal tissues to such procedures. Very young or aged people are not favorable patients for such replacements.

8. Thoroughly wash the preparation at all times during the operative procedure with a copious supply of warm water. This not only controls the heat produced, but keeps the tooth surfaces and operative field clear.

9. Always be careful of the soft tissues. Have full control of the rotary cutting instruments at all times. When applying fissure or end-cutting burs to the preparation for the purpose of creating a shoulder always

have the bur revolving in the opposite direction from which you are exerting pressure. This will avoid having the bur spin around the preparation, engaging the soft tissue, lacerating the gingival crevice and causing discomfort to the patient. The full effect of such an injury will not be apparent at first; however, later it will become evident in the form of recession and discoloration. Make every effort to complete the preparation without creating any hemorrhage.

10. Do not overprepare teeth, making them exceedingly thin and tapering. Such a convergent preparation will cause the jacket to fracture or become unseated later. Frequently, teeth are overprepared because the operator has a basic concept that all jacket crown preparations must have full or complete uniform shoulders. Such is not the case, as is shown by Brecker in his text, *The Porcelain Jacket Crown*, in which he lists many conditions wherein preparations with partial shoulders or the shoulderless type of approach are much more satisfactory.

From *Journal of Prosthetic Dentistry* 4:95-96 (January) 1954.

Enamel as a Barrier

TO CARIES

REIDAR F. SOGNAES, D.M.D., Ph.D., Boston

Fundamental Question Presented

It is now evident that both organic and inorganic matter will have to be coped with before a microorganism can invade normal enamel. Heretofore it was thought that the inorganic enamel crystals were stacked up against each other as so many pencils. With the high power electron microscope, every inorganic crystal appears to be held together by way of the organic matter in between.

Relation to Calcification and Caries—At present little is known about the nature of this bond which holds together so firmly all the hard tissues of the body. It is evident that the nature and function of the bond is of vital interest from the standpoint of calcification as well as tooth development and caries.

Contribution to Scientific Knowledge—As further information on this point is anticipated from other sources, there is in this case a real opportunity to contribute to the general fund of scientific knowledge.

Significance of Chemical Nature of Elements—Once the existence and morphologic pattern of the organic framework of the enamel has become clarified, it is next of immense interest to explore the chemical nature and the physiologic significance of these elements.

Theories Proposed

Several concepts have been suggested by investigators:

1. It is believed by many investigators that a keratin-like substance contributes to the organic framework of the enamel. This conclusion is in harmony with the evolutionary origin of the enamel.

2. Embryologic observations also point to an epithelial origin of the enamel.

3. Histologists have emphasized the similarities between the staining reactions of enamel matrix and cornifying epidermis. Semispecific histochemical methods have more recently strengthened this view.

4. The presence of chemical protein reactions, recently fortified by observations with paper chromatography, suggest that hydrolysates of demineralized enamel contain an amino acid composition compatible with a keratin-like substance.

Histochemical Examinations—Two other reactions have also been revealed by preliminary histochemical examinations: (1) suggesting the presence of a polysaccharide, probably an acid mucopolysaccharide, and (2) a delicate sudanophilic reaction, suggesting a phospholipid. These reactions appear to be most marked between the enamel prisms or more specifically in the region of the prism sheaths.

Basic Elements of Hard Tissue—It would now seem to be possible to make a general statement regarding the building blocks of hard tissues in general, bone, cementum, dentin, and enamel. The three major components common to all of the hard tissues which may be likened to bricks, mortar, and reinforcement of a building are (1) the inorganic crystals; (2) the polysaccharide ground substance; and (3) the fibrous protein framework.

Penetration of Ions

The surface of the submicroscopic crystals appears capable of giving up and taking up such ions as phosphorus and calcium continuously even after completion of the primary calcification.

Penetration Both Ways—It is quite evident that various ions can readily penetrate through the enamel from the inside into the surrounding environment and from the external environment (saliva) through the enamel and into the pulp and bloodstream.

Penetration of Elements not Normally Part of Teeth—Two-way travel is true, not only of phosphorus which is an integral part of the tooth and which exchanges with the phosphates on the surface of the crystals, but also true of elements like iodine which do not normally belong in the teeth, but which nevertheless are going through both ways.

Conclusion

When more is learned of this process there is the hope that substances may be introduced which will be useful in the maintenance of health in these tissues.

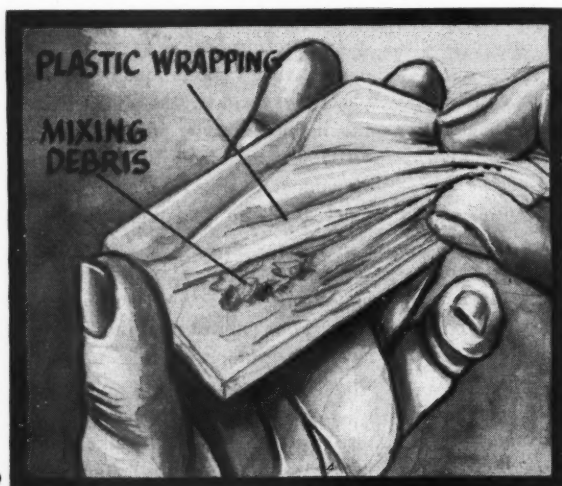
Adapted from *Illinois Dental Journal* 22: No. 7, 425-427 (July) 1953.

TABLE
The place of enamel in the family of hard tissues.

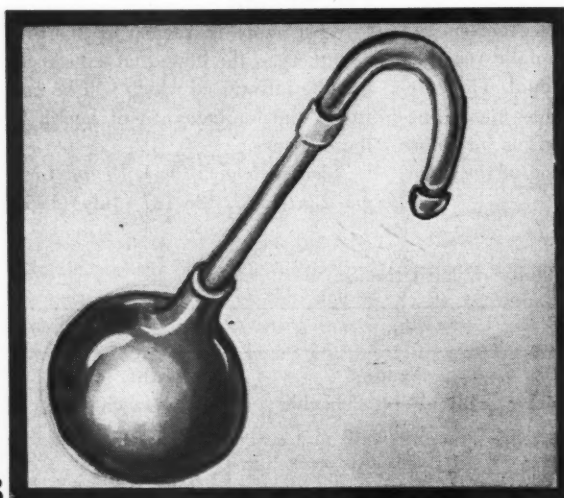
Main Components	Bone	Cementum	Dentin	Enamel
Inorganic crystals	Apatite	Apatite	Apatite	Apatite
Ground substance	Polysaccharide	Polysaccharide	Polysaccharide	Polysaccharide
Fibrous framework	Collagen	Collagen	Collagen	"Keratin"
Cellular components	Osteocytes	Cementocytes	Cell processes	None
Blood vessels	Present	None	None	None



1



2



3

Clinical and Laboratory

Improving Articulating Paper

Marvin Sniderman, D.D.S., Pittsburgh

1. If one puts a light coating of cocoa butter upon articulating paper immediately before use the paper will mark more distinctly.

Plastic Wrap for a Mixing Slab

S. M. Dooreck, D.D.S., Brooklyn, New York

2. Cover the glass mixing slab with a piece of plastic Saran wrap. After the cement has hardened, peel off and discard the wrap. The slab remains clean.

An Extra Saliva Ejector

C. S. Webb, Jr., D.D.S., Bowling Green, Virginia

3. For an extra saliva ejector that can be used anywhere, insert the saliva ejector into a large water syringe bulb. The patient or the operator may squeeze and release the bulb as necessary.

READERS are Urged to Collect \$10.00

For every practical clinical or laboratory suggestion that is usable, DENTAL DIGEST will pay \$10.00 on publication.

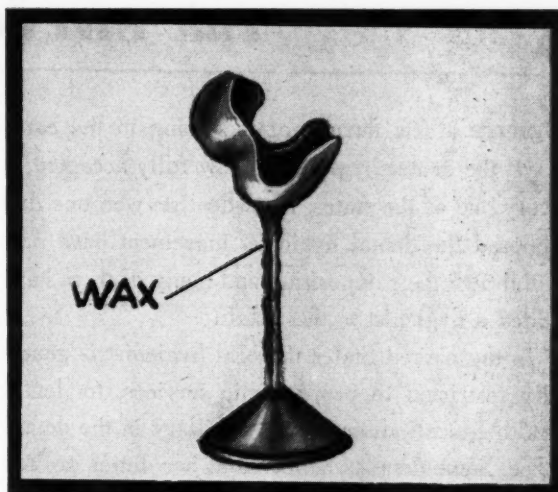
You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make suitable illustrations; write a brief description of the

SUGGESTIONS . . .

Covering a Sprue Pin

Cyril B. Kanterman, D.D.S., Uniontown, Pennsylvania

4. To prevent distortion of the invested wax pattern when the sprue pin is removed, the pin is coated with a thin layer of wax prior to investing. When the ring is heated, the wax on the sprue melts allowing the pin to be removed easily.

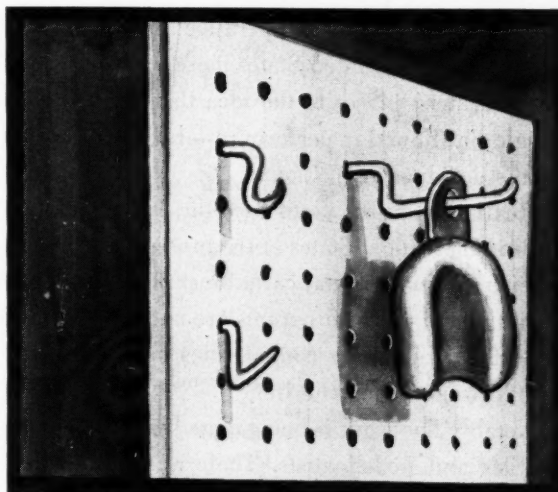


4

A Fixture for Impression Trays

Irving B. Bennett, D.D.S., New York

5. A Masonite peg board with the accessory hanging fixtures is installed inside a door or on a wall to hold impression trays or other laboratory instruments.

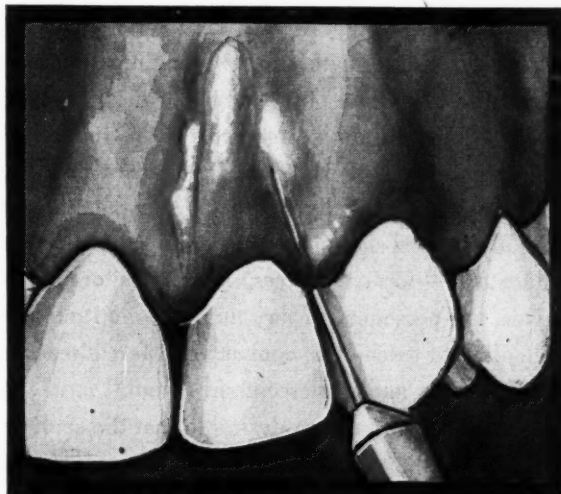


5

Anesthesia for an Acutely Inflamed Tooth

A. S. Pawlowski, D.D.S., Oglesby, Illinois

6. To obtain anesthesia for an acutely inflamed tooth, inject the anesthetic solution in short, forced jets between the root and the wall of the socket.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 378 for a convenient form to use. Send your ideas to Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S Page

DESPITE a few flurries of misgiving in the early days, the dental hygienist is now fully accepted in every one of the states. Most dentists who one day opposed the dental hygienist movement have now withdrawn their opposition and many of them have added a hygienist to their staff.

In the United States the oral hygienist is generally restricted to prophylactic services, to dental health education, and as an ancillary in the dental office. Some dentists believe that her duties are too restricted. These people point out that in New Zealand the dental nurse, after two years' training, is qualified to perform prophylactic services and in addition the simple operative procedures for children. In the United States there has been opposition in most places to the idea that the hygienist should be allowed to perform restorative operations on the deciduous dentition.

Realism requires us to face the issue that children in the United States at the present time do not receive adequate dental care. Most public and parochial school dental programs are understaffed and underfinanced. Many communities have no school dental program for children.

Notably fine work is being done by public health dentists and pedodontists. Their numbers, unfortunately, are few and their influence has not spread widely among the profession and the public. The blunt fact is that most dentists prefer to treat adults. That is why dentistry for children suffers.

An influential British medical publication¹ has made two important observations:

(1) "Money now devoted to the instruction of children and others whose eating and oral hygiene habits, and whose values about dental health, are already formed should be diverted to 'educating the educators'—doctors, nurses, health visitors, midwives, the personnel of day nurseries and nursery schools, and teachers in contact with parent-teacher organizations and adolescents in school."

(2) "We think it also desirable that the services

of a dental auxiliary should be available to mothers and children attending antenatal clinics, infant welfare centers, day nurseries, and nursery schools. To all children attending the centers, nurseries, or schools, and to those referred by the family doctor, the dental auxiliary would give regular routine inspection, instruction in oral hygiene, and simple treatment where required. Doubtful or difficult cases could be referred to the local-authority dental surgeon or to private practitioners cooperating with the dental service. Even without the evidence about New Zealand dental nurses, our experience in other fields, such as midwifery and nursing, should have convinced us that, in their own restricted fields, ancillaries can achieve greater skill than a general practitioner. Their use in dentistry would release the dental surgeon to practice dental surgery in the fullest sense."

The proposal that money should be spent to educate the educators is sound. It does little good to condition a child to the facts of nutrition and hygiene, then to see the structures of facts destroyed by an ignorant or indifferent school teacher, school administration or parent-teacher group. So long as candy, cookies, pies, cola drinks are available in school lunch rooms and dispensing machines, all the *talk* poured forth in dental health lectures will do little to change the action pattern of food selection and food consumption.

The analogy between midwifery and nursing and the potentials of an expanded service by the dental hygienist is an appealing one. Both the midwife and the nurse are trained to relieve the physician from many routine demands and allow him to expend his skills and energies on more important issues. We should explore the possibilities of training the dental hygienist to relieve the dentist from many routine demands. The delegation of some of the operative phases of dentistry for children to a well-trained woman does not lessen the importance of this valued service.

¹Burgess, Anne, and Burton, John: Control of Dental Caries, *Lancet*: No. 6815, 773 (April 10) 1954.



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U. S. Dollar,

*Steele's Facings and Tru-
pontic teeth (in New Hue
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Wherever possible always use Steele's GOL-FAC backings when restoring anterior teeth with Steele's Facings or Trupontics in New Hue shades. The gold labial face of these backings preserves the original New Hue shades — making shade matching easier and insuring best esthetics.

Steele's GOL-FAC backings have the same physical properties and mechanical advantages as the standard Steele's P. G. backings, and are therefore adapted to the same technics.

NOTE: In casting to any Steele's backing always use a *protective* type of investment (Steel's Super Investment).

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Iatrogenic Heart Disease

Iatrogenic heart disease is a condition wherein symptoms referable to the heart or so interpreted by the patient are produced as a result of the words or actions of a physician. Even though the condition is preventable it produces considerable morbidity. It may easily be more disabling than ordinary heart disease.

The treatment is specific and differs from the management of any other type of cardiac disorder. Prevention is the most important aspect of the problem. Several possible initiating factors may lead the patient to believe that he has heart disease: (1) misinterpretation by the patient of innocuous statements by the physician, (2) ill-considered remarks or acts of the physician, and (3) error by the physician in interpreting symptoms or findings.

Usually, the common reaction of a person receiving a diagnosis of heart disease is fear. Anxiety neurosis or neurocirculatory asthenia may ensue causing symptoms of such a nature as to suggest to the subject that cardiac function is disturbed. A vicious circle is started, consisting of anxiety-producing symptoms causing further anxiety.

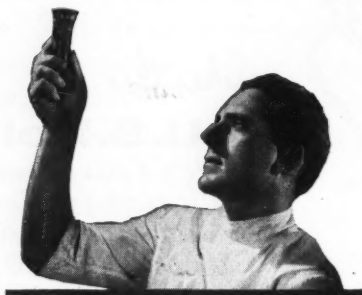
The manifestations of iatrogenic heart disease are those commonly produced by anxiety: (1) Palpitation, (2) fatigability, (3) breathlessness, (4) precordial pain, (5) apprehension, (6) trembling, (7) dizziness, (8) syncope, (9) tachycardia, (10) paresthesia, and (11) cold clammy hands and feet.

When untreated the malady is self-perpetuating because the symptoms continue to suggest cardiac abnormality and maintain the patient's fears. The prognosis in treated cases depends on many factors. Results are usually best when the process is of short duration.

The emotional make-up of the patient is important. Some are basically psychoneurotic. Others are not intelligent enough to understand a reasonably simple explanation of the origin

MEDICINE

and the Biologic Sciences



of a pain near the heart and hence persist in believing that the condition is heart disease.

Treatment depends on successful reassurance of the patient. The doctor must conduct an examination sufficiently extensive to convince himself and the patient that the heart is sound. The use of all the supplementary tools of cardiovascular study is encouraged to add authenticity.

The reassurance, to be effective, must be clear-cut and without qualifications. It is helpful to point out that the symptoms are not dangerous to life, no matter how distressing subjectively. The patient should know that the symptoms will leave if apprehension is relieved but may persist if the fears are retained at a conscious or subconscious level. Attempts to carry on in spite of symptoms are important. Efforts at compromise, such as advice to take things easy, may be disastrous by negating the assurance of cardiac soundness. At times, unqualified assurance that the heart is absolutely normal must be given even when slight doubt exists.

Weinberg, Harry B.: *Iatrogenic Heart Disease*, *Ann. Int. Med.* 38:9-22 (January) 1953.



Male Climacteric

The middle-aged and elderly male undergoes a syndrome comparable to the female climacteric. The change is caused by progressive testosterone deficiency resulting primarily in metabolic and circulatory symptoms and producing secondarily sexual effects. The satisfactory response to testosterone gives validity to the diagnosis.

The syndrome resembles the female climacteric in the variability of symptoms. These may be slight or severe, short-lived or prolonged. In men (1) irritability, (2) insomnia, (3) personality changes, and (4) nuchal aches and pains are common whereas, in women (1) hot flashes, (2) tachycardia, (3) palpitation, and (4) general aches and pains are more frequent. Subjective nervousness is the commonest symptom for either sex.

Decreased libido and potency occurs in 75 per cent of men during the climacteric. Impotence occurs in 50 per cent. Eventually the symptoms give way to the apparently asymptomatic postclimacteric state, with gradual development of senescence. Libido and potency are not dominated exclusively by hormonal influences. The general somatic and mental symptoms, therefore, do not correlate with the purely sexual aspects. Libido and potency may be maintained to some extent by elderly males who have typical climacteric symptoms.

Testosterone secretion may decline at any age but the magnitude of the deficiency is likely to increase with advancing years. Extremely low ketosteroid excretion is probably the result of both a testicular deficiency and a decrease in adrenal cortical function. Diminished testosterone secretion is not always associated with a compensatory reaction of the anterior pituitary.

Testosterone administration controls circulatory symptoms such as sweating and hot flashes in 100 per cent of the cases, while (1) palpitation, (2) vertigo, (3) anginal pain, and (4) chilliness are corrected in 80 to 92 per cent of the patients. Among metabolic deficiency symp-

toms (1) fatigability, (2) weight loss, (3) weakness, and (4) signs of prostaticism are controlled in 100 per cent of the cases. Muscular and central nervous system complaints respond in 60 to 80 per cent of the patients.

Well-being, vigor, and ambition are usually noted by these patients during treatment. Even when full control over all symptoms is established treatment should not be ended.

Goldzieher, Max, and Goldzieher, Joseph W.: Diagnosis of the Male Climacteric, Geriatrics 8:1-10 (January) 1953.



Failing Heart—Basic Principles of Therapy

Body water is divided into intracellular and extracellular compartments. The principle cation of the intracellular compartment is potassium; of the extracellular compartment, sodium. Sodium is fixed in the extracellular space and does not traverse the cell membrane. The major shifts of water occur when sodium (not potassium) is retained or excreted. The principle aim of therapy, therefore, is to prevent the retention of abnormal amounts of sodium with a consequent holding of large quantities of water.

Food is the only source of sodium. And a low sodium diet decreases the availability of the ion. Sodium-binding resins absorb about 50 per cent of ingested sodium.

The glomerulus filters water and crystalloids. As the filtrate passes through the tubules, certain high threshold bodies (water, sugar, sodium, and potassium) are resorbed selectively. Low threshold bodies are rejected. A mercurial diuretic transiently paralyzes the tubular cells and consequently, temporarily, even the high threshold bodies are lost. The loss of water and sodium reflects itself in the draining of the extracellular reservoir.

The digitalis principles are used to improve the ability of the heart to function as a pump. This enhances the circulation of the kidney, thus increasing its ability to rid the body of sodium.

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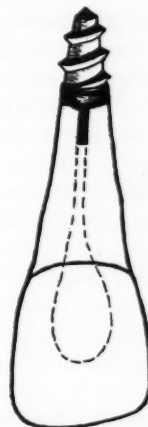
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The value of oxygen therapy lies in the increase of oxygen in the blood stream. The rate of oxygen absorption from the pulmonary epithelium by the blood is directly proportional to the partial pressure of the oxygen. If the percentage of oxygen in a mixture is increased with the atmospheric pressure remaining the same, the partial pressure of oxygen is increased, and hence more oxygen is forced across the alveolar membrane. The effectiveness of oxygen therapy is related only to the effectual concentration of the oxygen, not to the type of device used. The chief indications for oxygen therapy are (1) dyspnea, (2) cyanosis, (3) periodic breathing, (4) rising heart rate, and (5) certain arrhythmias.

Schmitt, G. F.: Therapy of the Failing Heart, Postgrad. Med. 13: 344-353 (April) 1953.



Pain from Cancer

In the United States approximately 200,000 persons die each year from cancer. Many of these suffer severe pain during the last months of life. The pain becomes progressively worse and finally develops into a boring, relentless, intolerably agonizing suffering. This suffering may cause a physiologic as well as a psychologic deterioration.

The factors usually responsible for the pain are the following: (1) compression of nerve roots, trunks or plexus by the tumor or by pathologic fractures of bones adjacent to the nerves, (2) infiltration of nerves and blood vessels by tumor cells, resulting in perivascular or perineural lymphangitis and irritation of sensory nerve endings producing a diffuse burning pain, the so-called sympathetic pain, (3) obstruction of a viscus with production of true visceral pain, (4) occlusion of blood vessels by the tumor, (5) infiltration, tumefaction, and swelling in tissue invested snugly by fascia, periosteum or other pain-sensitive structures, and (6) necrosis, infection, and inflammation of pain-sensitive structures causing pain that is sometimes excruciating.

Three procedures, alone or in combination, may be employed to help these persons: (1) psychologic support, (2) palliative operation, and (3) nerve block. Analgesic block, when properly executed and effective, affords adequate relief without adding to the patient's discomfort.

For pain of the face, mouth, tongue, throat, and neck, alcoholic injection of the trigeminal nerve or its branches, the glossopharyngeal and vagus nerves, and/or the upper cervical

spinal nerves is usually quite effective. Pain below the neck can be controlled for weeks or months with subarachnoid alcohol block, paravertebral block, or injections of peripheral or intercostal nerves. The sympathetic nerve system is involved in the pain mechanism of many of these cases. Therefore, sympathetic nerve blocks are occasionally necessary.

Bonica, J. J.: Management of Pain of Cancer, J. Michigan M. Soc. 52: 284-291 (March) 1953.

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Salivary Gland Swelling

Problem

A patient complains of pain and swelling in the region of the submandibular gland at meal times. No stone has been demonstrated clinically or radiologically. Is it worth trying to stimulate salivation with mercury to "flush out" the gland, are antibiotics indicated, or is there any other treat-

ment for this annoying condition?

Discussion

Despite the clinical and x-ray appearances in this case it is probable that the patient has a stone in the salivary duct. Such a stone may be quite small, in fact no larger than a pin's head. Scrupulous digital palpation of the floor of the mouth just after the patient has sucked a piece of lemon may reveal the stone. It is

not uncommon for a very small stone to be missed in the x-ray films, and these should certainly be repeated.

Additional Exposures Recommended—Sucking a piece of lemon may bring the stone forward into the duct and thus enable it to be seen in an occlusal film of the floor of the mouth. In the ordinary lateral oblique views of the submandibular region a stone may be superimposed on an area of dense bone. It is usually wise to take further shots from different angles.

Exploration of Duct Advised—It is most unlikely that the symptoms described are due to anything else but a stone. Subacute infection, such as is sometimes seen in the parotid gland, is rare. It would be useless to prescribe mercury preparations, and, in the absence of superimposed infection by a sensitive organism, antibiotics are without value. Even if repeated investigation of this case fails to reveal a stone it is worth while considering exploration of the duct.

Adapted from Medical News, *British Medical Journal* No. 4860: 531 (Feb. 27) 1954.

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Contra-Angles

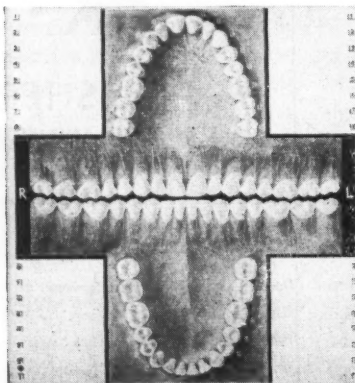


How to Read

Those of us who were brought up in the old laborious days of teaching reading by emphasizing each letter, t-h-i-s i-s a c-a-t, t-h-e b-o-y l-o-v-e-s t-h-e g-i-r-l, will be surprised to learn that reading has become a skill that is directed and controlled by electronic devices.

The new techniques of reading are based on grasping thought units rather than concentrating on isolated letters and words in training the eye to encompass larger blocks of type. These are not fancy gadgets created by Rube Goldberg. The famous engineering school, the Illinois Institute of Technology has the instruments. Their nature and use is described by *Editor and Publisher*: "Two instruments are used for reading rate training: The tachistoscope and the reading rate controller. The tachistoscope is a flash-meter device for increasing the eye span. As the eye span is increased the length of each fixation time is decreased and a person perceives more in a broader peripheral span. Tachistoscope training teaches him to see things as a whole rather than piece-meal. This device projects images—forms, digits, words, phrases, and sentences—on a screen through a shutter on the flash-meter, which ranges in speed from one to one-hundredths of a second.

"The reading rate controller is another device for speeding up reading and is designed to develop rapid eye movements across each line and to eliminate regressive movements. Through training on the rate controller and the tachistoscope an individual learns to read faster and comprehend more accurately because he is trained to grasp larger thought



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units at one time. Rapid reading is also a boon to his concentration as he perceives more in wholes and in less time."

Many people do not like to read. The funny pictures or the sport pages are sufficient for them. They prefer to spend their time in other pursuits. Certainly no one should force an improvement in reading skill upon them. Other people would like to read more and with better comprehension to improve their vocational ability or to widen their enjoyment.

Dentists are accepted in society as belonging to the professional class, as being men who are supposed to be learned. To actually be learned requires reading. There is no substitute. If reading is a bore and a chore it is unlikely that the dentist or any other person will exert himself to absorb the kind of culture that comes from the printed word.

It is encouraging to know that reading skills for adults can be increased from 300 or 350 words to 1,000 words per minute. (There are approximately 350 words in a full column of DENTAL DIGEST text. At an average rate of reading speed it would take a dentist one minute to read one column. At the improved rate he could read three columns in one minute.) But this magazine is only one of the printed sources that requires the dentist's time. There are other dental publications as well as magazines of general interest, newspapers, books, advertising pieces that make demands upon the time of the dentist.

In addition to increased speed, the ability to read in larger segments increases comprehension. At one time it was believed that the slow laborious reader was absorbing more of the meaning as he plodded along. Actually, the slow one was trying to memorize the text or his mind was so full of other thoughts that he was only looking at type without comprehending the meaning.

The function of writing is to convey thoughts, facts, ideas, emotions, information. The function of reading is to comprehend these many facets of life. The more readily the reader



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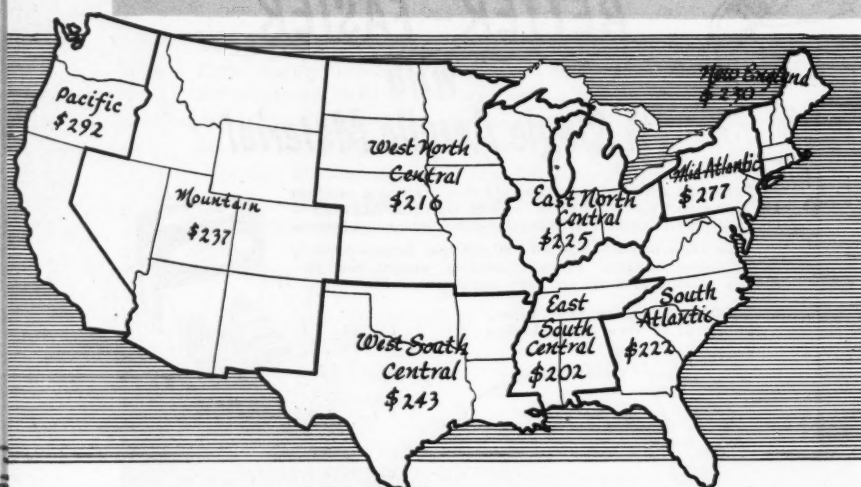


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Dental Fees Compared On a Regional Basis

Glance at the map and you'll see a surprising variation in fees throughout the United States, with the Pacific Coast area ranking highest and the East South Central states lowest in comparing the cost of a typical case. The data is from the records of Professional Budget Plan.

Figures for jackets, crowns, bridges, inlays, and other dental services are most interesting, too, and are detailed in chart form to make comparison easy.

★ ★ ★

What are your personal views on professional courtesy? Do you agree with the majority of dentists interviewed by Daniel S. Schechter that the custom should be abolished? Even though most dentists may prefer to pay for treatment and to receive payment for services rendered to colleagues, no one seems to want to break tradition and begin billing his friends in the profession.

★ ★ ★

Patients have some strange ideas of dentists' knowledge, training, and ability. Doctor C. W. Garleb believes that dentists would be wise to take time to dissipate some of the false ideas patients may entertain in respect to dentistry and dental practitioners.

★ ★ ★

"When Should a Tooth Be Extracted?" an article by C. Shields, invites readers to comment on cases

from their own records. He starts the discussion by citing instances in which the diagnosis for extraction was reversed to the patient's advantage.

★ ★ ★

Commenting on a recent Oral Hygiene editorial, "The Stresses We Live Under," Edith Calmenson analyzes the psychological factors which underlie many unsatisfactory dentist-patient relationships. Her very short article is more penetrating—and more helpful—than many a full-length treatise.

★ ★ ★

"Every practicing dentist can play a vital role in dental research," insists Doctor Philip Parker in the article, "The Forgotten Man at the Dental Chair." The experience of the man at the dental chair must supplement the work of The Council on Dental Research if this research is to become purposeful and productive.

★ ★ ★

It is difficult for a dentist to maintain a large enough staff to relieve him of all the non-technical details of practice. Three dentists, Doctor Leonard V. Foley, Doctor Robert P. Crow, and Doctor Gerald E. Halker, have solved that problem—and an even greater one, that of giving patients more expert care and dentists more equitable income—by initiating their own plan of "Group Practice—An Approach to Ideal Dentistry!"

can put himself in rapport with the moods, intentions, objectives of the writer the more fully will he profit from the particular mission of the writer.

A quick look at some writing will tell us that the subject matter, the style, the point of view are not to our liking. In other cases we will like everything about the writing. We are interested in the subject, we like the warmth of friendliness or pungency or detachment of the manner. We all have different tastes. By increasing our reading skill we do not have to ponder long over the writing that does not whet our interest. Improved reading ability gives us pleasure in reading more on subjects that we like by the authors of our preference.

In a country where every man can read what he likes, where there is no censorship, no government newspaper, no licensed books, we should make the most of these treasures of freedom—that is, for the one who likes to read. It is the privilege of one who does not enjoy reading to follow his own inclinations and avoid the printed word whenever he can. Not to do something that is distasteful is also a part of the heritage of freedom.

Bleeding in the Night

Every dentist has probably had the experience of a patient, or more often a perturbed member of his family, calling in the quiet of the night to report that he is close to death from hemorrhage from a tooth socket. A small capillary oozing takes on the red colorings of a major crisis in the dead of night. So far as the records show, none of these bleeding sockets proceeds to extremis except perhaps in the case of the true hemophiliac.

When we receive such a call we cannot deprecate the anxiety of the bleeder or his agitated relative. We must stir ourselves from the slow mindedness of our interrupted sleep to make the calm announcement that the condition is annoying but not dangerous. A bit of strong biting pressure on a piece of gauze is usually sufficient. Some dentists recommend the use of a tea bag over the socket.

"I have in my office a booklet published by you in 1940, called 'Visual Education in Dentistry.' I have used this booklet so frequently that it is completely worn out. Can you tell me where I can get another like it or similar to it? I shall be very grateful for this information." --Missouri

"Please send ten copies of 'Visual Education in Dentistry.' I place these booklets in the reception room and many mothers request copies. I believe you would have a heavy demand if this idea were promoted." --Indiana

"Last week I received your booklet, 'Visual Education in Dentistry.' It is the best work on this subject that I have ever seen. You certainly are to be congratulated. Next week I am giving part of my time to a group health program and I would like to have two or three more copies." --Maryland

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"'Visual Education in Dentistry' has proved popular here at the School of Medicine." --New York

"Will you please send me a copy of your very fine booklet, 'Visual Education in Dentistry.' It was recommended to us by Professional Budget Plan." --Minnesota

"Kindly send me several more copies of 'Visual Education in Dentistry' for the education of the back-woods people I serve in my country office. A few copies of this book, given to teachers, will do a great deal of good. These charts will do more than books to educate the layman." --New York

"Will you please send me the booklet, 'Visual Education in Dentistry,' designed to explain dentistry to patients? I have very religiously consulted this booklet at the office of my dentist, and find it so instructive that I believe it should be a requisite in my home."--California

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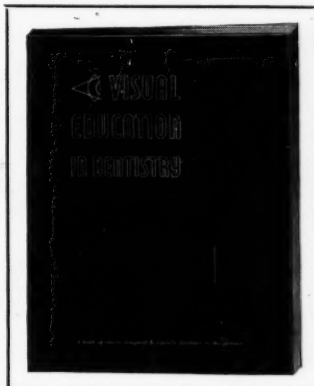
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Other Recent Comments

● "I recently saw a copy of Visual Education in Dentistry and thought it to be quite interesting. I am opening my office February 3 and I believe that such a booklet would be valuable in showing my patients various phases of dental pathology, and efficacies of proper dental restorative work." Chicago.

● "Please send us two of your booklets on Visual Education in Dentistry. We find it very important in our office. The one we have now is in shreds." Milwaukee.

● "Please send me your booklet, Visual Education in Dentistry. I have the ninth edition and have about worn it out. I couldn't do without it." Muskogee.



● "I received a copy of Visual Education in Dentistry today and am very pleased with it. Several of the illustrations are just what I have been looking for. I intend to frame some. Since this would destroy the book would it be possible to get two more copies?" Randolph.

● "I have seen your booklet Visual Education in Dentistry and have found much of value in it. Are you still publishing it? If so, send me the price so that I can order it." Hiawatha.

● "We think your Visual Education in Dentistry is splendid. Please send us two more copies. We could use them to great advantage." Chelsea.

● "Several weeks ago I received a copy of Visual Education in Dentistry. Would it be possible for me to have another copy? It has had much use in my waiting room and one more would be helpful." Auburn.

It is a fact that more and more dentists are ordering two copies of *Visual Education in Dentistry*—one for use in the reception room and one for use at the chair. And more and more dentists are referring to these charts as the most ethical and practical available for use in patient-education programs.

In addition we are receiving an increasing number of orders for the complete series from school teachers in the elementary and high schools—teachers who are finding *Visual Education in Dentistry* a valuable aid in their dental health programs. One practitioner in Indiana is giving the booklet to mothers who request it. *He believes that idea should be expanded.* The price is only \$1.50 to Dental Digest subscribers. Here is real potential value at low cost. We refer the special combination offer (see coupon) to nonsubscribers. Why not send your order immediately?

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CLINICAL AND LABORATORY SUGGESTIONS

(See pages 366 and 367)

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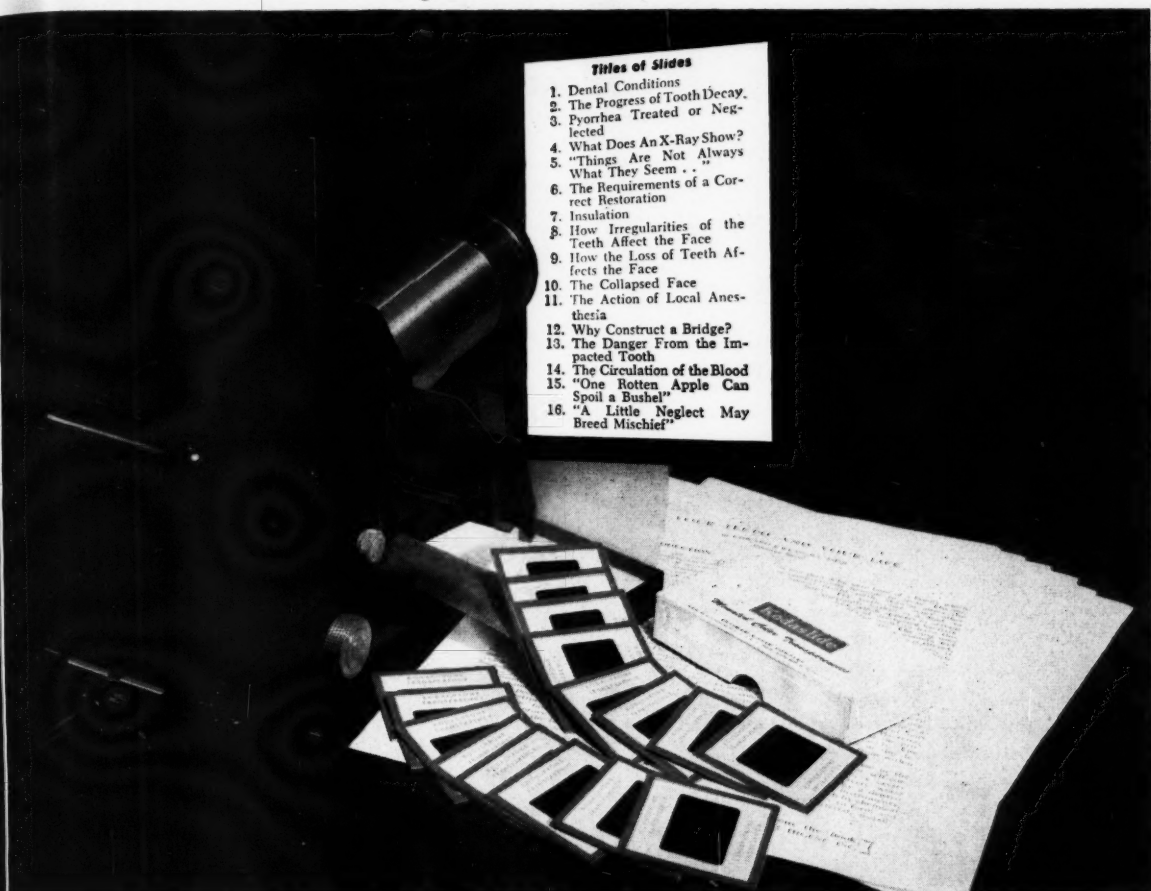
plus biting pressure. Whether there is enough tannic acid in tea to act as a hemostat is a matter for a pharmacologist to decide.

Dentists have to meet these nocturnal emergencies less often than do their medical colleagues. For this we should be grateful. Not without humor do some physicians face these events of the middle of the night. Richard T. Barton, writing in *Post-graduate Medicine*, describes the nosebleed situation delightfully:

"To appreciate fully the anxiety of a nosebleed, one must be called at 3 a. m. some morning and go to a patient's house. There you find a large, obese patient lying in a bed, damp and soggy, partly from melted ice and partly from blood. Her nightgown is spattered with blood. There is blood on the floor around a washbasin which is filled with clotted blood, and saturated tissues fill a paper bag. The patient is bug-eyed with fear, and standing around the bed, even more frightened, is one, two or three relatives, each of whom tries desperately to mop every drop, yes even every erythrocyte as it trickles from the upper lip.

"Then comes the massive emesis! A large clot is propelled up from the stomach and into the basin. This swallowed blood is interpreted by all as being the patient's spleen, liver, or some other vital organ and an obvious peroral evisceration. This, of course, is an exaggerated and somewhat comic picture, but it testifies to the degree of psychic shock involved in this condition.

"Under such circumstances as I have described, one should walk into the room and act as though he were completely oblivious to the blood, as though that huge basin of blood were mere spotting. Then take the blood pressure, pulse, and listen to the heart. While the sphygmomanometer is still on the arm, slowly inject intravenously meperidine or codeine, the dose and drug as indicated. The patient relaxes. Don't burst into the room, look at the patient, gasp, and then frantically start stuffing vaseline gauze down the patient's nose. This type of heroic acting may be appro-



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priate for the situation of an emergency tracheotomy. However, this approach to the patient with nose-bleed who is already paralyzed with fear, is only going to raise the blood pressure to a head-throbbing level."

—E. J. R.

Some Dermatologic Lesions of the Mouth and Face of Interest to the Dentist

ARTHUR C. CURTIS, M.D.

Common Types

The facial (labial) type of herpes is one of the most common types, and its outstanding diagnostic criterion is grouped vesicles. There are two varieties, herpes simplex and herpes zoster, which can be distinguished clinically by a difference in degree rather than in kind. Herpes is usually due to a combination of infection (virus) and nerve trunk root irritation.

Herpes Simplex—Herpes simplex is less severe and there is burning or itching at the local site a few hours prior to the appearance of the vesicles. In herpes zoster there is a neuralgic type of pain along the nerve trunk several hours or even days before the appearance of the vesicles. In fully developed cases, the vesicles are generally tense and deep, 1 to 3 millimeters in diameter, with a pearly sheen on an erythematous base. They persist for several hours, or a day or so, then rupture and form a thin, moist crust. If secondary infection takes place, ulceration and slow healing are the usual sequelae. Tender enlargement of the regional lymph nodes is present in the more severe forms of herpes.

Slow Involution—While the clustered, superficially crusted vesicles of herpes are usually easily recognized, a herpes which takes more than two weeks to involute, especially if associated with a unilateral adenopathy deserves more study, for any lesion which is slow to heal, indurated and associated with a marked, usually painless, regional adenopathy must

be considered a syphilitic chancre until proved to be something else. Herpes zoster may also result from a metastatic neoplasm or from a lymphoma.

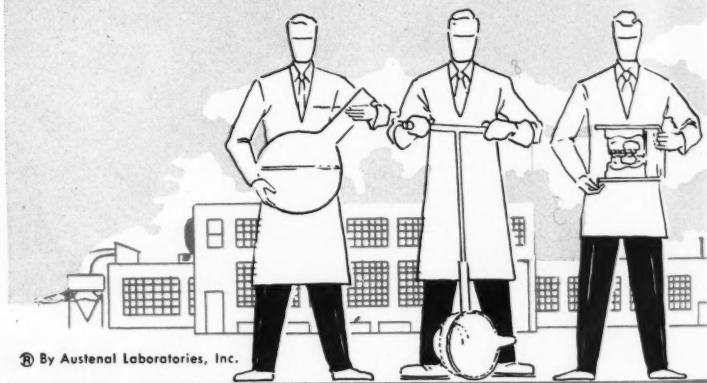
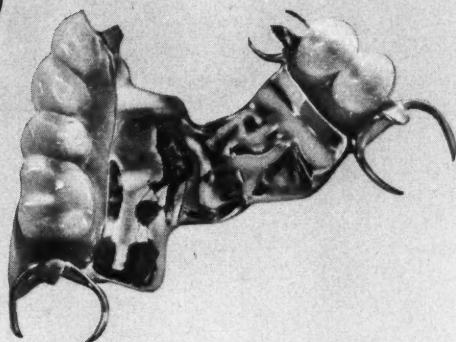
Pemphigus—A relapsing, often fatal disease, pemphigus forms flaccid bullae on a noninflammatory base, 1 to 10 centimeters in diameter. In malignant pemphigus the lesions usually occur in the mouth before there is any involvement of the skin. While the lesions often appear first about the gums, confluent geographic areas are found, especially over the soft palate and uvula. The surface of the tongue is unusually free until late.

Fetor is pronounced and the mouth is sore. It should be differentiated from erythema multiforme.

Erythema Multiforme — Vesicles and bullae are frequently found in the mouth in erythema multiforme which is an eruption which may be produced by a variety of causes. Besides the idiopathic type there is the type caused during the course of septicemia and other disease processes by the ingestion of certain drugs (by mouth or parenterally), such as: (1) the coal tar derivatives, (2) quinine, (3) mercury, (4) arsenic, (5) penicillin, (6) the ingestion of stale meats, fish and other

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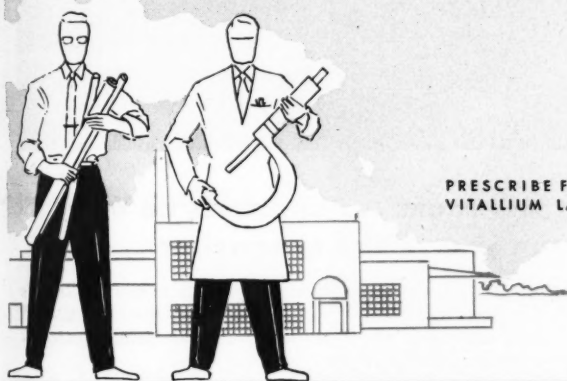
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foods. The eruption consists of bright red macules some 5 millimeters in diameter which rapidly enlarge peripherally and become first papular, later vesicular or bullous. The most frequent sites involved are first the dorsums of the hands and feet and secondly the oral mucous membranes. The buccal mucosa, lips, and pharynx are the sites of predilection and the bullous lesions predominate. However, the bullae soon rupture leaving a superficial erosion with shreds of gray epithelium dangling from around their circular, erythematous borders. It should be recalled here that the bullae of pemphigus occur on a non-

inflammatory base and a careful history also should provide valuable clues for differentiating these two conditions.

Causes

Contact with specific local sensitizing agents such as the essential oils in tooth pastes or mouth washes, the plastics in toothbrush handles, or the aniline dyes in lipsticks frequently produce acute vesicular or bullous eruptions of the mouth or lips.

Therapy

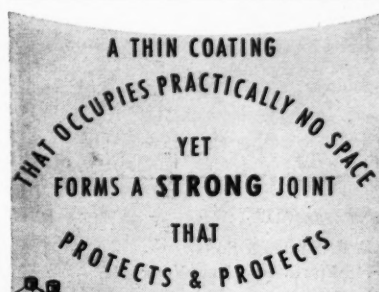
The chemical similarity of diethylstilbestrol and stilbamidine would encourage the theory that the two com-

pounds have similar biologic effects. In the comparison of these two substances for their effect on B. dermatitidis, stilbamidine showed inhibition in dilutions as low as 0.01 milligram per milliliter of medium and the next most effective substance was diethylstilbestrol. More extensive in vitro studies are now being done on the stilbene group of drugs to determine their fungistatic qualities on the organisms which cause both the superficial and the deep mycoses. Their mode of action is likewise unknown and is the subject of further study.

Many substances are fungistatic when studied in vitro. When given orally they may be destroyed by the gastrointestinal secretions; when given parenterally, they may be toxic or may be conjugated into valueless compounds. The proof of effectiveness of any fungistatic agent lies in its therapeutic use in both animals and man.

Clinical Use of Diethylstilbestrol

Two patients with cutaneous blas-
(Continued on page 384)



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